

The Refrigeration Service Engineer

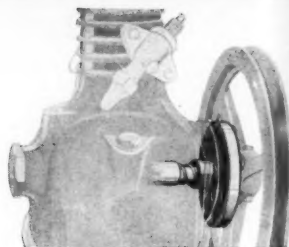
JULY • 1936



Field Service on G. E. Hermetic Units •
Special Service Valves for Hermetics •
Servicing the Fairbanks-Morse Refrigerator

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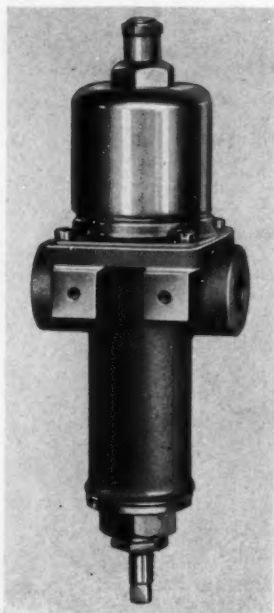
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Write for Bulletin 15 giving full information and detailed drawings on Blue Ribbon Pressure-Controlled Water-Regulating Valve.

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The REFRIGERATION SERVICE ENGINEER

Devoted to the Servicing of
REFRIGERATION UNITS and OIL BURNERS

VOL. 4

JULY, 1936

NO. 7

COVER

THE Mills compressor illustrated on the cover is being used in the laboratories of the Refrigeration and Air Conditioning Institute, Chicago, to provide students in refrigeration with practical experience in the application of refrigeration to commercial problems.

The unit is a 1-hp. job, operating at a motor speed of 1750 r.p.m. It is a two cylinder reciprocating type air-cooled compressor, using a 15 lb. charge of methyl chloride.

Primarily the unit is used for refrigerating a walk-in cooler. However, it is so connected that it may also operate a floral display case in multiple connection, together with a meat market display case.

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*Build
BETTER
PERFORMANCE
into 1937 models*



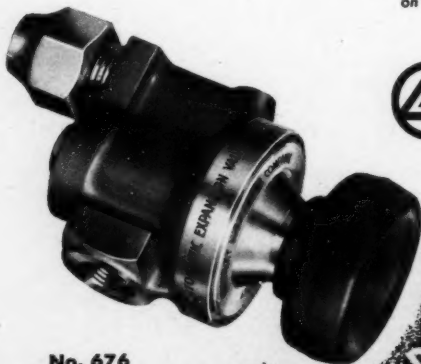
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Write for detailed information
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No. 676



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The Refrigeration Service Engineer

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OFFICIAL ORGAN REFRIGERATION SERVICE ENGINEERS' SOCIETY

VOL. 4, No. 7

CHICAGO, JULY, 1936

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Field and Shop Service on General Electric Hermetic Units

FIRST ARTICLE

This is the first of a series of practical articles on servicing G.E. Hermetics. These articles will feature the servicing of Models D.R. 1, 2, 3, 4 and 5. In this first article the author outlines the possible service complaints that may be remedied in the field.

The articles to follow will deal specifically with shop work.

By EDW. D. GEISER

The author in this and the articles to appear in succeeding issues has endeavored to give a complete and comprehensive method for field and shop service of the General Electric Hermetic unit.

This refrigerating unit is not of the conventional type and therefore not thoroughly understood by the average service man, consequently the author suggests that the methods described be given full trial, as these methods have been used most successfully for some time past and the results from service and efficiency of the machine have proven the value of these instructions.

The field for this type of service is in its infancy as far as individual shops are concerned and open a profitable field for those who will do an efficient and workmanlike job.
—Editor.

Field Service on General Electric Hermetic
FIELD service on the General Electric Hermetic is considerably restricted due to the very nature of the machine as com-

pared with the conventional type, yet many times it is possible to correct most of the troubles in the interior.

In many cases the service man will find the machine very poorly located for the best operation. By this we mean that insufficient circulation of air causes higher head pressures, long running time, noise and consequently high current cost.

The condenser may be located in a warm part of the room and the refrigerator frequently pushed tight against the wall thereby cutting off most of the circulation. Many people object to the dust collected by the condenser and cover it with some material which of course materially increases the load imposed on the unit.

Float Valve

The float valve provides a means of entry into the unit and as this is the important part in field service we will deal with it first.

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By referring to sketch of float, Fig. 1, visualize its action and purpose. The service man should always keep in mind that the float valve always goes into purge position when locking screw is turned out approximately four turns. This permits gas or liquid to feed directly from condenser into evaporator and whenever refrigerant or refrigerant and oil are added to machine the float should be in full purge position, thus preventing gas or liquid from being forced back into the condenser and dome.

On a few models of water coolers and like equipment the float does not have this purge advantage, so that the float ball will have to be lifted with a magnet. A magnet sufficient to pull the float ball can be wound in any shop, and is a very handy article. Such a magnet should be in every service man's kit.

In normal operation the float dome should be at nearly the same temperature as the lower turns of the condenser.

Field Service Complaints

The following are the complaints encountered in field, and the repairs usually necessary.

Machine Will Not Run

Check electrical leads to machine. Ascertain if there is current at male plugs of switch. If satisfactory remove switch cover, inspect bimetal strip to see if it is in running position and the end resting on trigger release which should be $\frac{1}{10}$ -in. from edge. After a long period of operation this strip quite often becomes distorted. Use adjustment screw on opposite end of strip to adjust. If strip is in running position check small heater overload directly inside of bimetal strip and make sure there is no burned out stranded conductor lead.

If when on and off position, switch is operating and relay does not function, check starting resistance coil. On vertical switch it may be a blue porcelain coil of resistance wire wound ceramic spool or copperode. Make sure that this is not burned out. On flat type switch this resistor is located in rear right hand corner and is either clamped or screwed into place with Edison socket.

Check points and clean; check thermo syphon and make sure that it has not lost its charge.

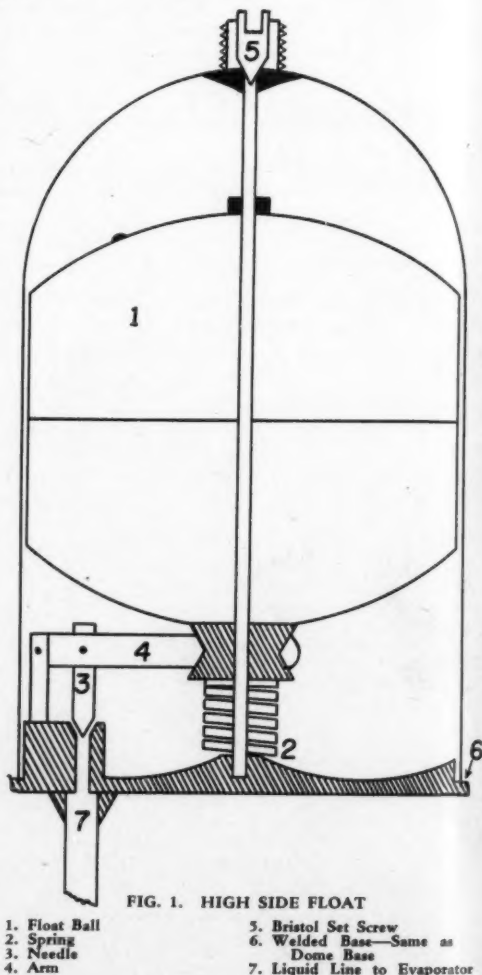
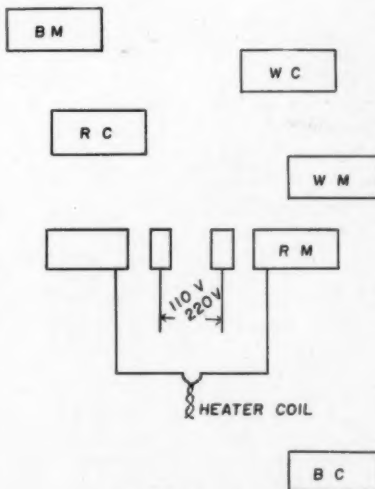
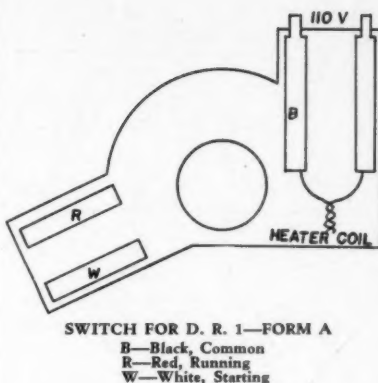
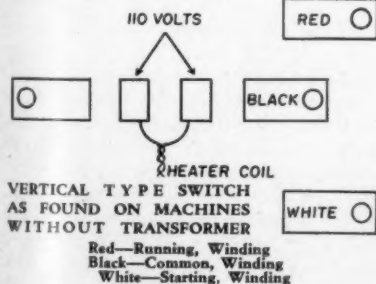
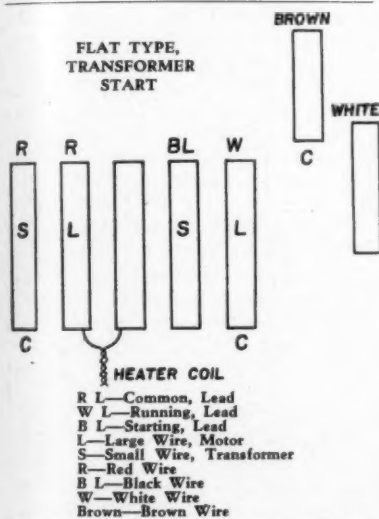
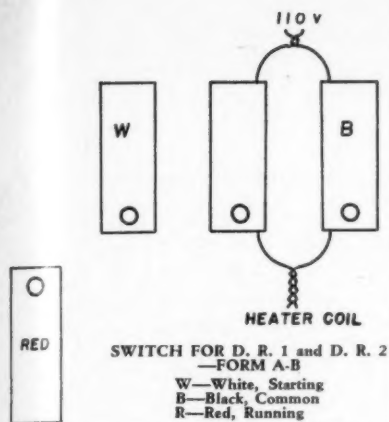


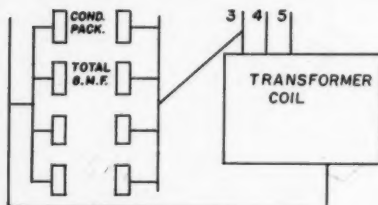
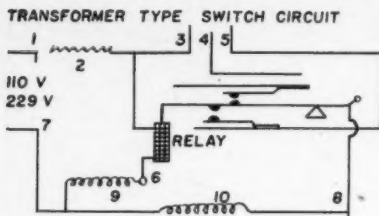
FIG. 1. HIGH SIDE FLOAT



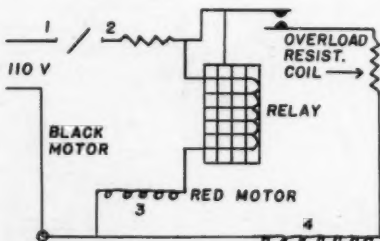
VERTICAL TYPE TRANSFORMER START

B M—Black, Motor Lead
R M—Red, Motor Lead
W M—White, Motor Lead
B C—Black, Transformer Lead
R C—Red, Transformer Lead
W C—White, Transformer Lead
B M—Starting, Lead
R M—Common, Lead
W M—Running, Lead

Fig. 2. All illustrations on this page and page following are switch hook-ups found on G. E.'s.



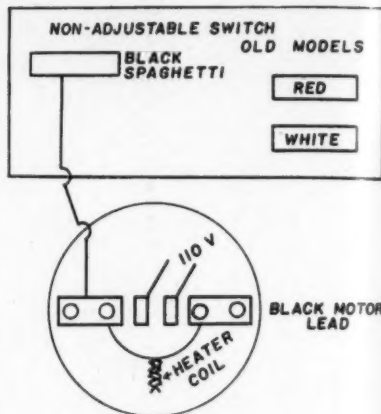
- 1—Thermo Switch
- 2—Bi-Metal Overload
- 3—Red, Condenser Transformer
- 4—Black, Transformer
- 5—White, Transformer
- 6—White, Motor Lead
- 7—Red, Motor Lead
- 8—Black, Motor Lead
- 9—Running, Winding
- 10—Starting, Winding
- White—Running
- Red—Common
- Black—Starting



CIRCUIT FOR CONVENTIONAL SWITCH

- 1—Thermo Switch
- 2—Bi-Metal Overload Switch
- 3—Running, Winding (Motor)
- 4—Starting, Winding (Motor)
- Red—Running
- Black—Common
- White—Starting

If after above operations, machine will not start remove switch and proceed as follows: On all models except DR.5 which is 220 volts, attach test lead wire from 110 volt supply to the running and common leads (check switch drawings Fig. 2 for color code) and apply current. With wire shorted from the starting to running leads, machine



should then start in less than 5 seconds. The above method throws both the starting and running windings in the circuit.

Caution: When making the above motor starting test, do not apply current for more than 45 seconds between starting and running, or running and common as this will damage motor beyond repair if not already burned out.

When above test has been made and motor will not start one of the following defects is the cause. Compressor is stuck; motor shorted or grounded; low-side check stuck or high head pressure. In all cases with exception of last cause, machine will have to be removed to shop for repairs.

Removing Unit

When removing unit from box the easiest method is as follows: place foot on edge of door sill and with knee under evaporator force upward and rest porcelain top on top of cabinet and it is then easy to lift out.

Machine Runs but Will Not Refrigerate at All

This condition is indicative of a broken flapper valve, blocked float, blocked check or suction line or loss of refrigerant. In addition to the above, the improper action of the float will become gas or gas and oil bound. Only in the latter two is it possible to make repairs in the field. For gas bound float, place service valve in position and open valve to purge position. This will al-

low gas to pass into evaporator and in the event that this does not remedy difficulty, purge out the non-condensable gas from float. Loss of charge may occur from a leaky set screw of float necessitating replacing charge. If this in addition to the other conditions mentioned previously does not remedy trouble, unit will have to be removed to shop for repairs.

Machine Runs but Evaporator Does Not Get Cold Enough

The trouble may be a shortage of gas, lack of oil in dome, inefficient compressor, partially obstructed liquid or suction line or float. To service these complaints, proceed as follows: first, replace gas lost. If there is a shortage of oil in dome, this is caused by oil being carried over and not being able to return to compressor due to shortage of gas in evaporator. Add approximately $\frac{1}{2}$ to $\frac{3}{4}$ pound on brine tank models and only $\frac{1}{4}$ pound at a time on other models. Shortage of oil in dome is usually indicated by a rattling sound in compressor. Only in event that the above does not remedy condition, add from $\frac{1}{2}$ to 1 pint of oil (recommended 300 viscosity Argon oil). This may be done in the following manner: draw vacuum on small drum, suck the required amount of oil in, again draw vacuum over oil and add $\frac{1}{4}$ pound of gas. Shake well both before and during charging operation.

An efficient compressor may sometimes be corrected by adding oil, but if this does not correct trouble it will be necessary to remove to shop for rebuilding.

Obstructed Liquid Lines

Obstructed liquid lines can be flushed out by building up high head pressure (cover dome of compressor) and opening service valve to purge position. This also applies to blocked float. An obstruction in suction line will require removal to shop for rebuilding, as this condition is caused from scale inside of evaporator.

Motor Runs, Unit Refrigerates Properly but Rattles, or Does Not Shut Off

This indicates lack of oil, burned out heater coil, thermo syphon lost charge or syphon line loose on evaporator. The lack

of oil is explained in previous paragraph. To replace burned out heater coil proceed as follows: remove screws holding name plate in front of dome, remove rubber plug and pull heater coil from socket and if coil is cold replace with new one. This coil should be on at all times whenever cord is plugged into wall socket. Its purpose is to keep oil warm and to drive any gas out of dome, which would condense there.

If the syphon has lost its charge replace syphon in switch. If trouble is loose thermo line on evaporator, this is caused by loosening of clamp due to frosting or rusting, and this line must be securely clamped at all times.

The preceding field service operations represent the probable complaints encountered by service men in field with the exception of defective door gaskets, hardware or other minor complaints, which can easily be remedied as in conventional machines. The service man will soon ascertain what condition makes necessary removal of the unit to the shop for repairs.

In the August issue we will get into the matter of shop service which, I am sure, will be the interesting feature of this series of articles.

THERMOMETERS

SOMETIMES thermometers become inaccurate due to condensation of alcohol in the upper section.

To recondition such thermometers, remove the cap and then pass the bulb end through an alcohol flame.

Merely insert and remove rapidly from flame until the alcohol column touches the top. Then cool by waving in the air.

Just as soon as the column of alcohol begins to reach the top, the thermometer must be heated carefully. If excessive temperature is permitted the thermometer will be destroyed.

With proper care thermometers can be reconditioned by this simple method.

John Tweedie
Arizona

Your magazine is certainly a big help to me. I don't know where else I could get this valuable "dope."

Servicing the (1st Article) **Fairbanks-Morse Refrigerator**

Construction and Operation Details Given in
Manual Specially Prepared for Service Men—
Provides Basis for Intelligent Field Service.

THE Fairbanks-Morse refrigerator is made by Fairbanks, Morse & Co., Home Appliance Division, Indianapolis, Ind. To enable service men to more clearly understand the operation of this refrigerator and to make it possible for them to render intelligent service in the field, a manual has been prepared by the company giving comprehensive information on its construction and operating details.

The C line of compressors is made in two different models, the single cylinder and the twin cylinder, each having a bore and stroke of $1\frac{1}{16}$ in. These compressors are of the vertical reciprocating type, embodying a number of features to insure quiet and efficient operation. Leakage of refrigerant or the entrance of air past the crankshaft at the flywheel end is prevented by means of a bellows type seal. A stationary seal-face is held against a rotating seal-face on the crankshaft by a compression spring, forming a gas-tight connection that permits a rotary motion. The opposite end of the bellows is gasketed to the compressor body. The seal retainer plate holds the flange of the seal and the gasket in a counterbore in the body of the compressor. This counterbore is cut concentric with the compressor shaft so that when the gasket and the flange of the seal are placed in the counterbore the seal is forced to remain concentric with the shaft.

The eccentrics are equipped with oil dipper that pick up oil from the lower part of the crankcase on each revolution. Due to the speed of the eccentric, the centrifugal force throws the oil against the connecting rods and at the top of the stroke feeds the oil to the oil groove provided in the connecting rod, then through the channel drilled in the connecting rod. The oil is then forced

up the connecting rod channel into the wrist pin and wrist pin bearings. The seal and main bearings are lubricated by a gravity feed through the channels provided in the crankcase. These channels are fed from the reservoirs which are also built into the crankcase. The lubrication of the pistons is accomplished through the use of specially designed oil grooves in both the piston and cylinder wall.

The suction or intake valves are located on the valve plate directly above the pistons. The discharge valves are located on the top side of the same valve plate and, due to their bridge and spring construction, will withstand any reasonable amount of abuse.

When operating normally, the vapor returning from the evaporator follows the suction line to the service valve and enters the compressor through a fine mesh screen and travels up to the intake or suction valve located on the valve plate under the head of the compressor. The returning vapor occasionally carries more than the proper amount of oil with it. Some of the vapor will enter the crankcase and condense to a liquid there. Liquid sulphur dioxide is heavier than oil with the result that it settles at the bottom of the crankcase. When the compressor starts, the pressure in the crankcase is reduced and the liquid refrigerant boils up through the oil causing it to foam. The tendency of this oil foam is to travel with the vapor through the suction or intake valve into the cylinder and on the compression stroke is forced through the head valve into the condenser and the receiver tank.

These conditions lead to two difficulties: First the travel of the oil through the discharge valves causing a pounding noise; sec-

only, the oil supply in the crankcase is reduced. In the Fairbanks-Morse compressor, provisions have been made to minimize this oil pumping through the incorporation of a system which allows oil returning from the evaporator to separate from the vapor and drain into the crankcase and to reduce oil pumping from the crankcase. The vapor leaving the evaporator travels through the suction line to the inlet channel in the compressor body and passes through the screen

which protrudes into the inlet channel. The vapor continues upward until it strikes the baffle which is part of the cylinder head and, after passing under this baffle, strikes the oil separator,

This separator is composed of a piece of steel tube placed in the valve plate; the vapor now travels up and over the sides of this tube to the suction or intake valves of the compressor. While the liquid refrigerant is heavier than the oil in the system, the

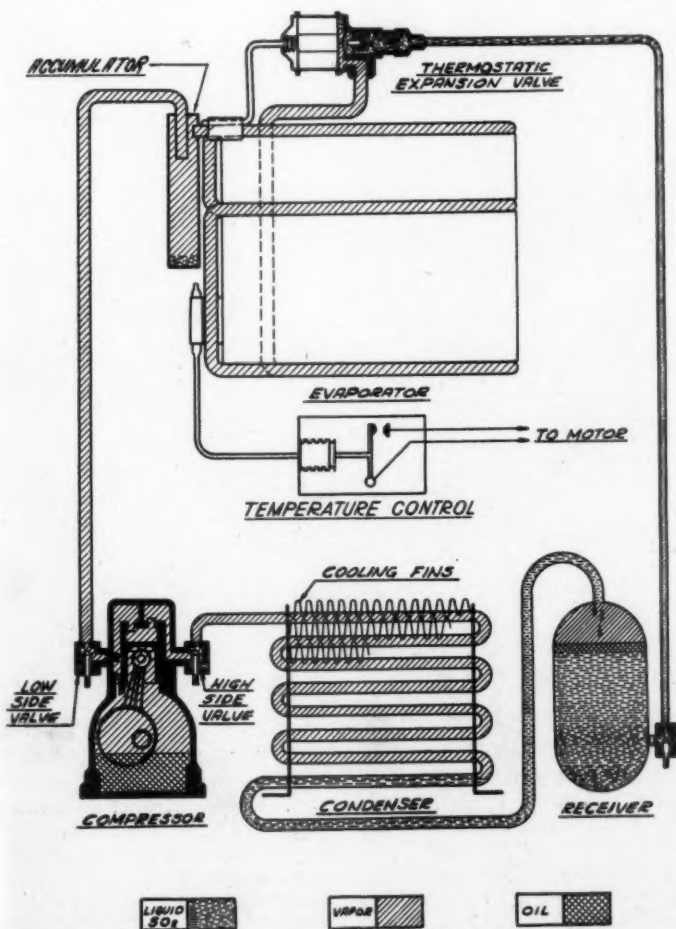


FIG. 1—FAIRBANKS-MORSE REFRIGERATION CYCLE

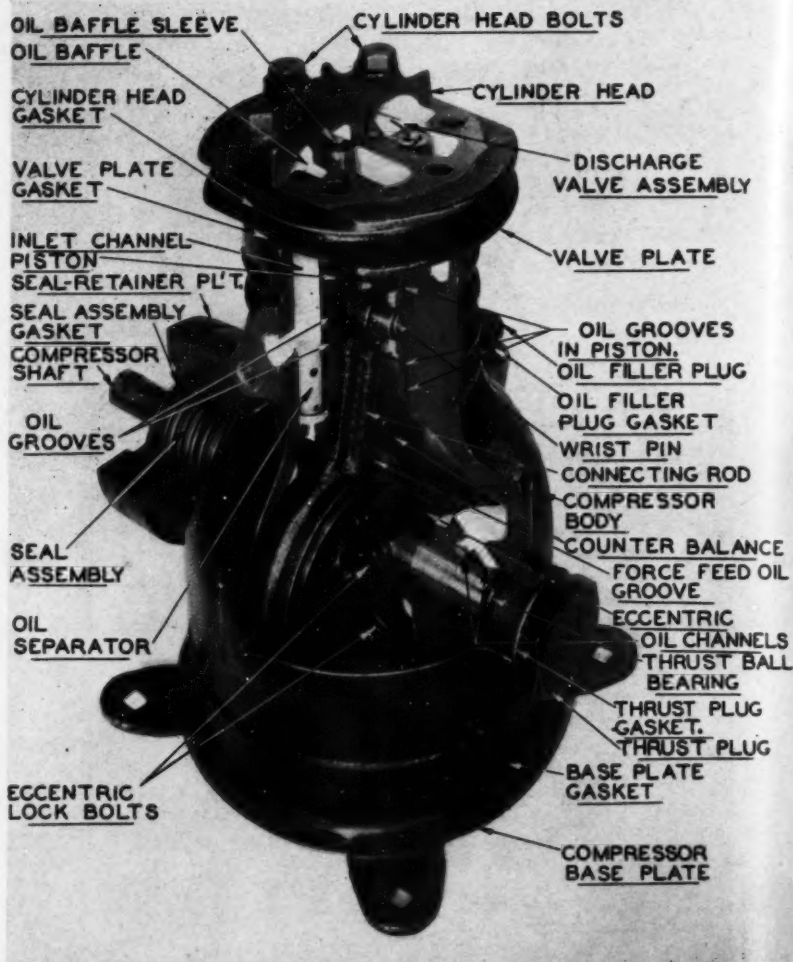


FIG. 2—CUT-AWAY VIEW OF THE FAIRBANKS-MORSE SINGLE CYLINDER COMPRESSOR

vapor is considerably lighter; therefore, by slowing up the travel of the vapor, the oil (being heavier) tends to separate from the vapor at each point where the course of the vapor is changed by the baffles used.

The separated oil accumulates until large enough amounts collect, after which it returns down the sides of the inlet channel through the lower and smaller hole in the small brass fitting that is located at the bot-

tom of the inlet channel, and finally through the very small opening at bottom of the inlet itself. The small hole at the bottom of the channel and the brass separator minimize the possibility of oil being pumped out of the crankcase and, at the same time, allow the oil that has been separated from the vapor to flow into the crankcase. The system is so designed that sufficient oil for lubrication is allowed to circulate through it at all times.

The compressor shaft is hardened and ground Nickel Molybdenum steel and operates in bearings which are diamond bored and finished by a process known as "bearinging," in which the bearings are finished by being rolled to size with a series of rollers. This operation reduces the porosity of the bearing, producing a dense, highly polished surface which reduces wear to a minimum. The eccentric in the single cylinder compressor is counter-balanced, minimizing vibration. The pistons are selectively fitted by hand to the walls of the cylinders, which are also bearingized.

Compressor Specifications

The specifications for Models C-1 and C-2 compressors are the same with the exception that Model C-2 is equipped with twin cylinder. These specifications are as follows:

Type: Single cylinder, vertical reciprocating.

Bore: $1\frac{7}{16}$ in.

Stroke: $1\frac{7}{16}$ in.

Valves: Intake and exhaust valves on same valve plate.

Shaft: $\frac{7}{8}$ in. front and back bearings; $2\frac{1}{32}$ -in. for flywheel.

Seal: Seal positively held concentric with shaft by locating seal nose, spring and flange in counterbores which are concentric with shaft.

Castings: The castings are refrigerator iron with fine carbon distribution, normalized before machining to prevent possibility of warping.

Shaft and wrist pin: Made of Nickel Molybdenum steel.

Finishes: (a) Main bearings and piston pin holes diamond bored and bearingized held with 0.0002 in. (b) Cylinder is diamond bored and bearingized held within 0.0002 in. (c) Seal nose is diamond faced in special high speed machine and inspected under powerful microscope for flaws.

Lubrication (Sealed): (a) Gravity feed to main bearings and seal. (b) Force feed to eccentric and wrist pin. (c) Positive lubrication of piston in cylinder by oil reservoir in the cylinder.

Oil Separator: Oil separator in suction port returns oil to crankcase.

For the condensing unit, standard equipment specifications for Model UC-1 are as follows:

Motor: $\frac{1}{8}$ hp. capacitor type 110 volt 60 cycle a.-c. motor. Motors are available to operate on current, of any specified voltage or frequency.

Condenser: Fedders single pass 8-tube condenser air cooled by fan on motor. Finish—Electro tinned.

Receiver: Steel cylinder — vertically mounted.

Base: Steel stamping—resting on four rubber cushioned springs.

Refrigerant: Sulphur dioxide (SO_2) Amount $1\frac{1}{2}$ lbs.

Oil: Anhydrous refrigeration oil—110 viscosity. Amount 14 oz. by wgt.

Standard equipment specifications for Model UC-2 condensing unit are the same as the above with the following exceptions:

Motor: $\frac{1}{8}$ hp.

Condenser: Fedders single pass 10-tube condenser.

Oil: Amount 20 oz. by wgt.

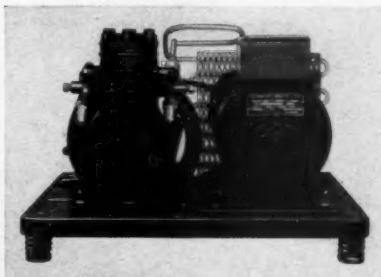


FIG. 3—UC-1 CONDENSING UNIT, FAIRBANKS-MORSE REFRIGERATOR

Either condensing unit may be equipped with d.-c. or odd cycle motors of any specified voltage. In the event that it is necessary to use other than the motor that is standard equipment, it will be necessary to maintain the proper compressor speed and also change the heater coil in the temperature control. This is due to the fact that different types of motors have different ampere ratings and, in some cases, were the original heater coil allowed to remain in the temperature control, the motor of another type would burn up before sufficient amperage passed through the heater coil to force it to open the circuit. If other than 110 volts are to be used, the light bulb in the cabinet must also be changed.

The condensing equipment is mounted on a base stamped from heavy gauge metal forming a rigid platform that is floated on rubber cushioned springs. The cup-shaped rubber caps are placed over the ends of the springs and the assemblies are placed under each corner of the condensing unit so that the rubber cups fit into the wells provided for them in the cabinet base and the condensing unit base. These rubber cushioned springs eliminate metal-to-metal contact at any point between the unit base and the frame of the cabinet.

finns are bonded to the tray sleeves to give definite metal-to-metal contact throughout their entire length. The tubes are arranged above and below every tray sleeve and are bonded to the sleeves; each tray rests flat on the bottom of its tray sleeve. In this type of evaporator, the trays are separated from the actual refrigerant only by the thickness of the copper tubes and tray sleeves.

The accumulator is a small cylindrical tank located immediately behind the evaporator. The evaporator tubing enters the

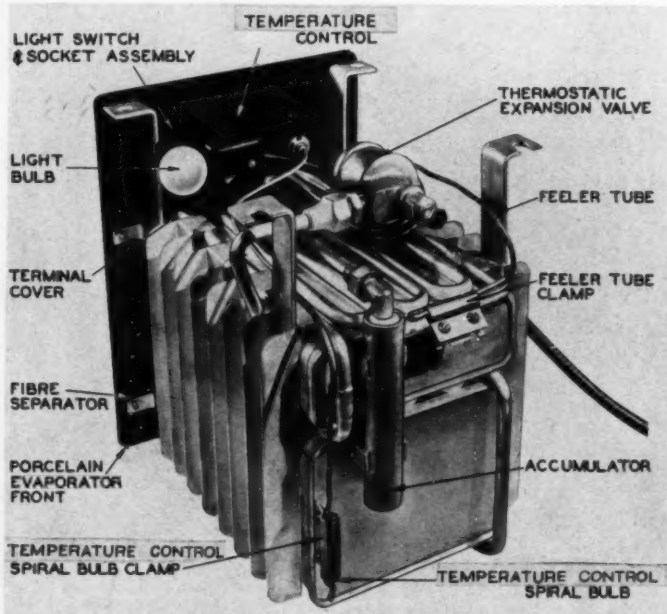


FIG. 4—VIEW OF THE EVAPORATOR, FAIRBANKS-MORSE REFRIGERATOR

The receiver is a welded steel tank with spherical ends. This tank serves as a reservoir tank carrying the excess liquid refrigerant not required in the evaporator. This tank is large enough to store the refrigerant that is pumped out of the evaporator and compressor if it is necessary to remove these parts.

The evaporators are of continuous copper-tube construction provided with copper radiating fins. This vertical fin area assures low box temperatures under all conditions. The

side of the accumulator very close to the top; the outlet of the accumulator is on the top of the cylinder and is connected directly to the suction line leading to the compressor.

The function of the accumulator is very similar to that of the ordinary line trap; and, in this case, it functions as a trap. If for any reason small particles of foreign matter are in the evaporator, they will be washed through the evaporator by the action of the liquid-laden vapor which is moving through the evaporator while the unit is op-

erating. When these particles reach the end of the evaporator, they enter the accumulator and, due to their weight, drop to the bottom. It is impossible for these particles to travel further because of the construction of the accumulator. The second and basic reason for the incorporation of this device is to prevent the return of any liquid. A thermostatic expansion valve is used to control the flow of liquid refrigerant into the evaporator.

Temperature Control

The temperature control and light switch assembly, including the light socket, is

mounted on the evaporator front as a unit. These units may easily be separated so that replacement of either switch may be made. This arrangement of controls or switches eliminates wiring of any kind in the cabinet walls through the use of a three conductor cord installed between the motor terminal strip and the control and light units. If no light is used, the conventional two conductor cord is installed.

The normal position of the temperature control provides an approved temperature, but five points on each side of this setting are provided so that individual requirements

FIG. 5. SERVICE VALVE, NORMAL OPERATING POSITION

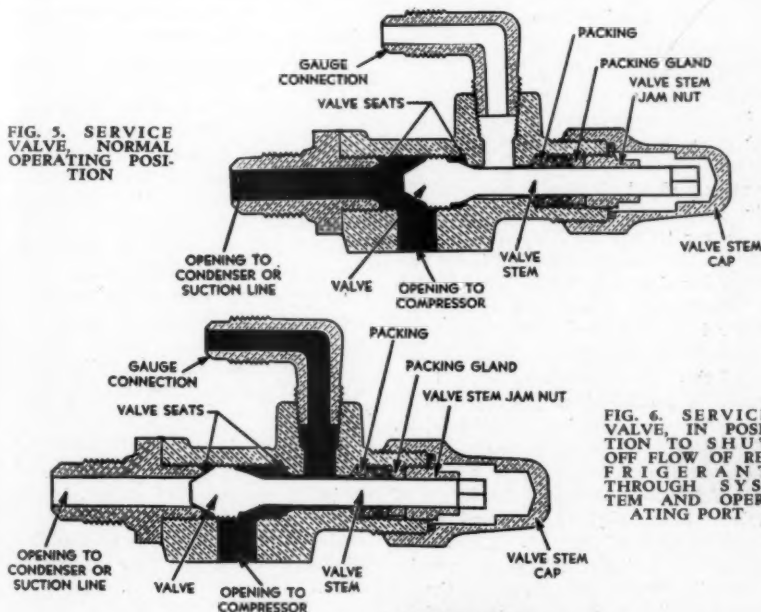


FIG. 6. SERVICE VALVE, IN POSITION TO SHUT OFF FLOW OF REFRIGERANT THROUGH SYSTEM AND OPERATING PORT

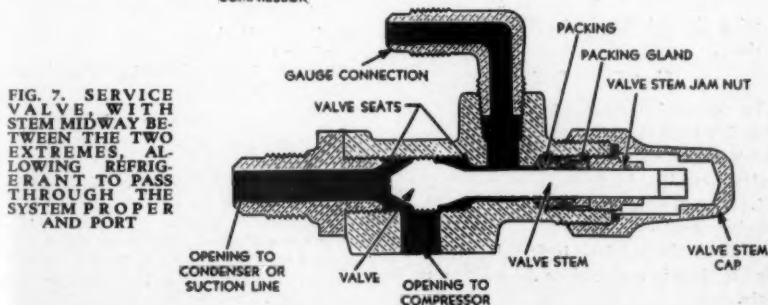


FIG. 7. SERVICE VALVE, WITH STEM MIDWAY BETWEEN THE TWO EXTREMES, ALLOWING REFRIGERANT TO PASS THROUGH THE SYSTEM PROPER AND PORT

may be met. The fifth point on the right is the coldest, producing very low temperatures for fast freezing of ice cubes or desserts, and on the extreme lefthand side of the dial is a vacation position provided for economical operation during vacation periods. By turning the pointer to the defrost position and allowing it to remain in that position overnight, the evaporator will defrost but the cabinet will be kept cool during that period. The temperature control also is equipped with an overload cutout that opens the circuit at any time the current drain becomes excessive.

Service Valves

The valves on each side of the compressor are dual or two-way valves. The port or external opening on the valve, into which a $\frac{1}{8}$ in. pipe plug is inserted, is provided so that the gauges may be easily attached to the unit and to facilitate the charging, discharging, and dehydrating of the unit. The valve located on the left hand side of the compressor (facing the front of the unit as it is placed in the refrigerator) is the suction or low side valve, while the valve situated on the right or motor side of the compressor is the pressure or high side valve. If there is any leakage of refrigerant from around this valve stem when the cap is removed, the packing should be tightened by turning the valve stem jam nut to the right.

The normal position of this stem while the unit is operating is turned all the way to the left. This allows an unrestricted flow of refrigerant through the valves and at the same time shuts off the port. The receiver tank valve is a single port valve. In order to stop the flow of refrigerant from the receiver tank this valve should be closed by turning the valve stem to the right until it seats.

Shut Down Periods

In cases where the refrigerator is to be shut down for the winter months, the system should be balanced. To do this, follow the instructions listed below:

1. Stop the unit by pulling out the temperature control button.
2. Close the receiver tank valve by turning the stem in a clockwise direction until it seats.

3. Defrost the evaporator by keeping the cabinet doors open. Remove the ice cubes and place hot water in the cube trays and place the trays in the evaporator to speed up the defrosting.

4. While waiting for the evaporator to warm up (it should be approximately room temperature) attach your compound gauge to the low side valve.

5. When the evaporator has defrosted:
(a) Start the machine and allow it to operate until the compound gauge reads zero (0). (b) Stop the unit. (c) The back pressure will increase again due to the fact that some liquid sulphur dioxide will remain in the line between the receiver tank valve and the thermostatic expansion valve. The passage of this refrigerant through the expansion valve may be hastened by placing the hand over the feeler tube of the expansion valve where it is connected to the evaporator. The heat of the hand will cause the expansion of the vapor in the feeler tube, thereby holding the valve open. Repeat (a) and (b) until the gauge will read zero (0) for several minutes with the unit turned off. (d) Remove the compound gauge and then close the suction and discharge service valves.

6. Warn the customer that the unit must not be started except by a service man.

In the next issue this article will be continued with instructions on trouble diagnosis, installing and removing gauges, testing for leaks, testing and replacing the compressor, replacing valve plates, repairing suction and discharge valves, and other service suggestions.

§ § §

Hamilton & Parker,
New York

Keep up the good work. Would be lost without your magazine.

J. L. McCarney, Mgr.,
New Jersey

I enclose money order for three dollars—two of which are for my subscription to THE REFRIGERATION SERVICE ENGINEER and the other for a binder. This magazine is an absolute necessity to me. I do not know how I did without it. I do not want to miss a single copy.

Special Service Valves for Hermetic Units

The Design of Simple Service Valves for Use on Valveless and Hermetic Units—Special Tools Necessary for Servicing Such Equipment.

By L. K. WRIGHT, A.S.R.E.

THE early designers of refrigeration apparatus intended for household use included standard valves in their products but soon learned to leave off the handwheels to prevent tampering with the equipment.

To further prevent unintelligent valve manipulation and in an effort to keep all but authorized representatives from adjusting or servicing equipment, designers next began to bring out unusual valve stem ends, some of triangular form, others recessed and some sealed with caps. This required the use of special tools and of course limited servicing to those who had access to the special service equipment.

Prior to 1930 the use of special valve end designs disappeared, the square stem end coming into broad use. With the advent of new comers into the refrigeration field after this date the idea of special tools was again revived, especially where the semi-hermetic and hermetic designs were concerned.

In hermetic layouts it became general to eliminate all service valves, cheapening the cost of production and eliminating potential sources of refrigerant leakage. A special charging plug is generally employed on such units which necessitates a suitable service or adapter valve.

Charging Ports

The charging plug itself is usually of steel and screwed into a threaded stud, as shown in the sketch in Fig. 1. In the illustration the plug is shown slightly off its seat or in open position. The end of the plug is generally provided with a slot to engage the screwdriver, a tang end of the service tool or it may have a square end, as in the case of the Frigidaire design. General Electric uses a slotted hexagonal opening in the plug

end, making use of a tool end somewhat similar to a set screw wrench.

The plug in the charging port as a rule is drilled through the center and this channel connects with a hole drilled in from the sealing face of the plug, as may be seen in the sketch. In most cases a protective shell or screwed bonnet will be found over the charging port to give protection to the threads, eliminate tampering and prevent leaks.

As the different manufacturers employed various sizes of threads and diameters in making up the charging port, as well as differing in their choice of stem ends, a tool of general utility was impossible. The present tool design, however, will serve as a basis for all valves, merely requiring proper stem end and adapter end changes.

Discharging Hermetics

As with any compression system, a hermetic machine must first be discharged or

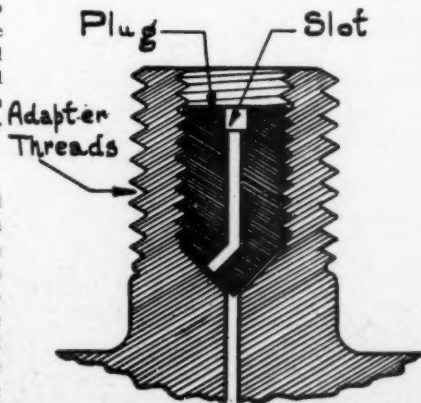


FIG. 1—CHARGING PORT

evacuated before any work can be done on its mechanical parts. By use of a special service tool the charge can be blown out to

the air or a compressor can be used to evacuate the system.

If desired, a high side (motor, condenser

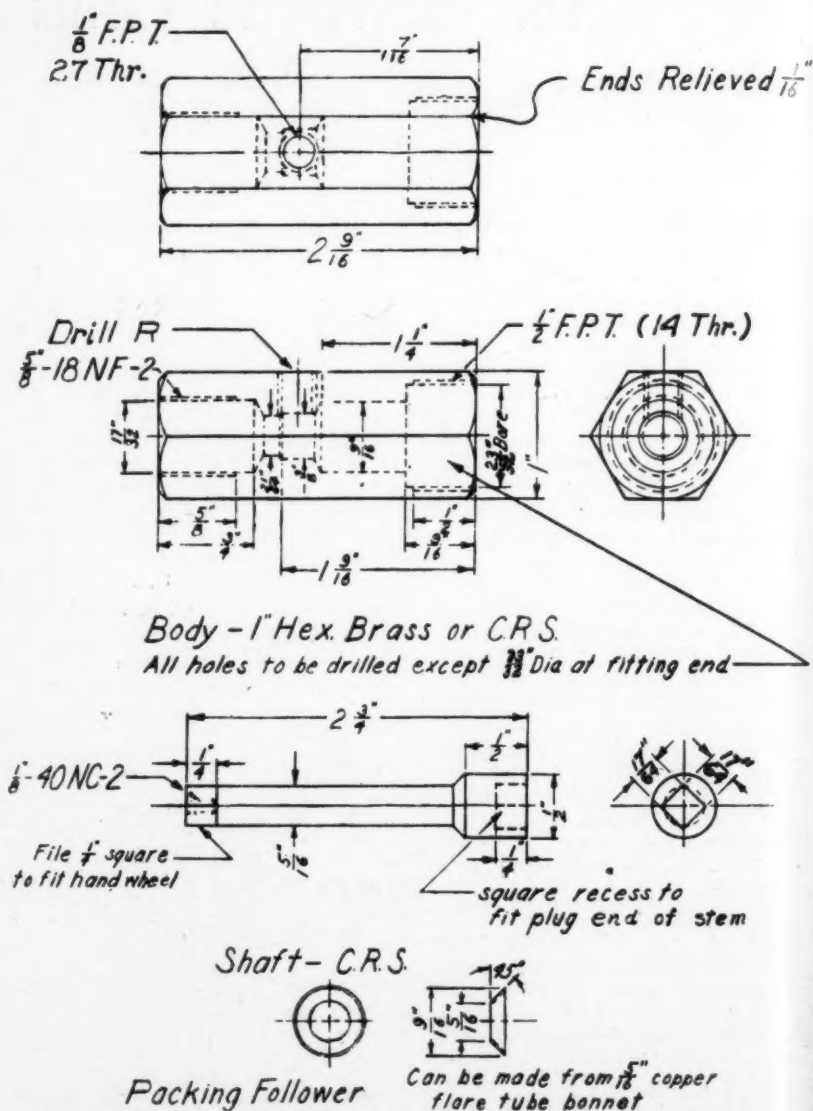


FIG. 2—DATA FOR CONSTRUCTION OF SPECIAL TOOL FOR USE ON PURGE PLUG OF FRIGIDAIRE HIGH SIDE FLOAT VALVE CHAMBER—REPRODUCED FULL SIZE

receiver) may be made up for the express purpose of evacuating systems so that the evacuated gas may be condensed and stored in the receiver of the unit. A large or oversize receiver may be installed, if desired, to hold several changes. Liquid can thus be saved and utilized again for recharging the overhauled units.

Never change or mix refrigerants in hermetics, as most of this type are direct driven and designed especially for a certain refrigerant. If another refrigerant is employed it may overload the motor, cause improper throttling and give poor service.

Charging Hermetics

Hermetics are charged by the liquid method, accomplished by heating the refrigerant cylinder slightly (about 20-25 degrees above room and unit temperature) and having the cylinder upside down so that liquid is forced out of the warm refrigerant cylinder into the cooler unit.

By using a loop in the charging line if copper tubing is employed or by employment of a flexible charging line and suspending the drum from a spring scale, or resting it on a platform scale, the correct refrigerant charge can be gotten into the system.

To check operation, allow the unit to run until it begins to cycle. Then take the temperature of the evaporator, temperature of the air going over the condenser and refer to data under heading of "Determination of Proper Charge in Air Cooled Units." If a shortage is indicated by low head pressure or by improper operation, an additional quantity of refrigerant can be added. In most cases the refrigerant and quantity is stated on the machine tag, so that little trouble will be experienced from this source.

Care in Reassembling

It is extremely important that the correct oil and proper quantity of it be replaced in hermetic systems. Use the best oils available and it will be cheapest in the end. Above all, keep the oil in a sealed can so that it cannot absorb moisture from the atmosphere.

Before charging an overhauled system evacuate all air. If possible, pull a 30 in. vacuum. Then give the system a "shot" of gas of the kind used in the system. Evacuate

this gas. It will scrub out any air remaining from the previous evacuation.

Extreme care is essential in working on the small high speed hermetics, for the valves and parts are necessarily delicate and tiny.

Frigidaire Service Valve

It will be observed that the tool required for Frigidaire work makes use of a steel shaft with a bulge at the engaging end. In the General Electric tool the shaft end is without bulge but the tool body is made as indicated in Fig. 3, to accommodate an extension or lip which projects from the charging port on this unit.

Data for the construction of a special tool for use on the new Frigidaire high side system is given in Figs. 2 and 3. If desired, two openings or ports may be drilled and threaded into the body of the valve, so that a service port as well as a gauge port is provided. Of course the single port may be equipped with a tee and do the same thing.

For other models refer to the data given in Fig. 4. The stem ends as well as information of adapter threads are given and beyond these changes the service valve tool remains as given.

Identification

Where different service valve tools are made up it is best to stamp each one with the name of the unit it will service. This data may be applied with steel stamps on the face of one of the hexagon sides of the body and will form a ready, indelible means of identification.

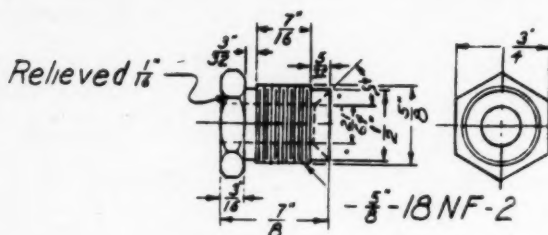
Threads may be warped and ruined if an improper adapter end is forceably screwed to charging port, therefore it is an excellent plan to punch the identification of each valve on its side or at least provide a tag, which while not as satisfactory or as imperishable as stamping, will serve if steel stamps are not at hand.

If desired, the builder can eliminate the valve wheel and apply his standard service wrench to the squared end. Another plan is to drill the $\frac{1}{8}$ in. shaft end with a $\frac{1}{8}$ in. hole and insert a $\frac{1}{8}$ in. cross-bar about 3 in. in length. The ends may be peened over to prevent the bar from falling out. If the bar is smoothed down with emery cloth it

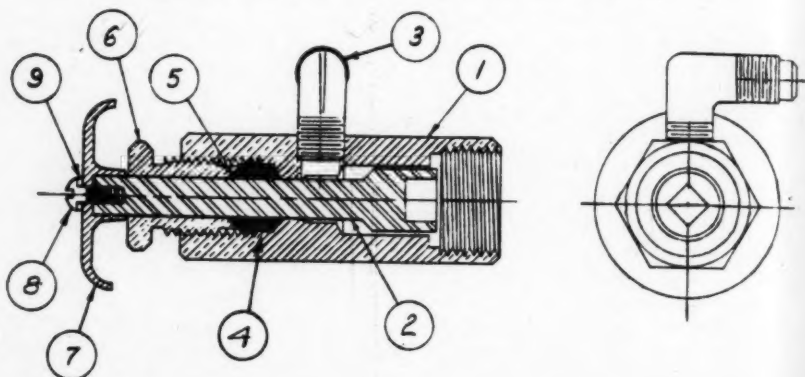
will slide in the opening and make the tool somewhat easier to operate in cramped quarters, as the bar can be slid back and forth.

Gaskets

A gasket must be cut and used between the adapter and the charging port to pro-



Packing Nut— $\frac{3}{4}$ " Hex. Brass or C.R.S.



Piece No.	Name	Quant	Mat'l	Notes
1	Body	1	Br or CRS	
2	Shaft	1	CRS	
3	Elbow $\frac{1}{2}$ " tube - $\frac{1}{8}$ " M.P.T.	1		Pur
4	Packing	1		Pur.
5	Packing Follower *	1	Cop	
6	Packing Nut	1	Br or CRS	
7	$\frac{1}{2}$ " Hand Wheel	1		Pur.
8	$\frac{1}{4} \times \frac{1}{2}$ " Rd Hd Machine Screw	1		Pur
9	$\frac{1}{8}$ " Lock Wheel	1		Pur.
* Packing Follower can be made from $\frac{1}{8}$ " flare tube seal bonnet.				

FIG. 3—ADDITIONAL DATA FOR CONSTRUCTION OF SPECIAL TOOL FOR USE ON PURGE PLUG OF FRIGIDAIRE HIGH SIDE FLOAT VALVE CHAMBER—REPRODUCED FULL SIZE

vide a tight joint. The regular asbestos-rubber material is the best all around gas-keting, but the artificial rubbers such as Duprene or Thiokol may be used. If facilities are on hand for cutting celluloid, gaskets of this material may be made up.

This material is impervious to oils and refrigerants and is excellent for the purpose.

For packing the valve stem use the regular stranded asbestos-graphite packing, commonly known as steam packing. Follow these instructions for good results.

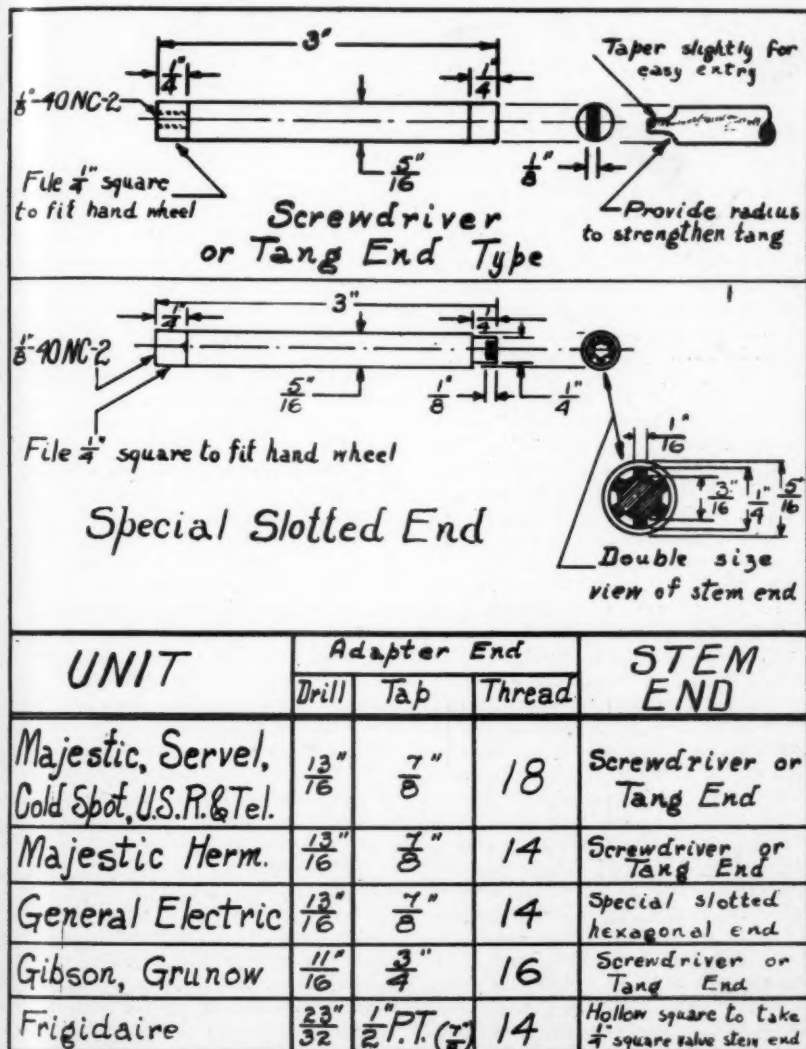


FIG. 4—VALVE DATA FOR HERMETIC UNITS HAVING SPECIAL PORTS—REPRODUCED APPROX. FULL SIZE

Servicing Commercial Refrigerating Systems

How the Temperature Requirements of Commercial Systems Differ from Household and Multiple Systems. Stages in Development of Commercial Coils and Other Service Details

By GEORGE CLARK, B.S., M.E.*

IN commercial systems the service to a large extent is very much the same as that covered under "Household" and "Apartment House Multiple Systems," published in the May and June issues. The chief difference between these types of systems and commercial systems is that in commercial work, temperatures are different than those required in household and apartment refrigeration.

Ice Cream Cabinets

In the case of ice cream hardening cabinets or cabinets for use in freezing fruits quickly, temperatures may be maintained in the cabinet itself as low as 20° F. below zero or lower. In order to obtain temperatures this low, the refrigerant of course must be evaporated at temperatures considerably lower, probably from -30° to -40° F. In some commercial work, temperatures may be maintained in some sort of chemical bath of 70° F. or over. If such temperatures are to be maintained in a liquid bath, it is quite possible that temperatures in the refrigerant of 65° to 70° F. may be employed. Various commercial installations employ temperatures ranging between those mentioned. A particular problem may require extremes in temperature above and below those given.

In obtaining these various temperatures, the type of evaporator which is used must be considered. If we are to maintain a liquid bath at 40° F. or above, an evaporator consisting of bare pipe or tube coils will be found quite satisfactory. If we are to maintain temperatures in air of 34° F. and above, a finned type of coil furnishing considerable cooling surface may be used. If the temperatures are to be maintained at below 50°

F., it is quite probable that in some part of the refrigeration cycle the coils will become frosted. However, during an off period of the refrigerating machine, the coils will warm up sufficiently to defrost and no particular problem arises in connection with frost clogging between fins.

Sub-Freezing Temperatures

If we are to maintain sub-freezing temperatures by means of some type of evaporator coil, we should use plate coils or bare tube coils and not depend on finned tube coils for our cooling surface. Any coil which is to operate at sub-freezing temperatures or any coil which is to hold a cooler at sub-freezing temperatures will not get a chance to defrost and consequently the finned type of coil will build up a considerable amount of frost between fins and will render it ineffective.

Cooling surface greater than that obtained in bare tubing or bare pipe coils may be obtained by the use of plate coils. This involves the use of a metal plate to which is attached the evaporator tubes, the surface of the plate being considerably greater than the tube surface. Plate coils are generally made with flat surfaces and when they become excessively frosted, the frost may be scraped off by means of some sort of flat instrument.

Where extremely low temperatures are desired, a brine tank which forms the wall of the cooling compartment is generally used as in ice cream dispensing cabinets and ice cream hardening cabinets. The refrigerants to be used in connection with extremely low temperature work should be chosen with the

* Detroit School of Refrigeration, Chairman National Educational and Examining Board, R.S.E.S.

idea of being able to obtain the low temperature desired without too great a sacrifice in machine capacity. Thus for extremely low temperature work, methyl chloride and "Freon" are used rather than sulphur dioxide. Carrene and ethyl chloride of course would be entirely unsuitable for low temperature work.

Early Evaporators

As in household refrigeration, the commercial type of cooler is also a stage in the evolution of the ice box into the perfected cooler. The first evaporators used in commercial coolers resembled those used in household machines and these of course were built very much to replace a cake of ice, being large, rectangular tanks and having an operating temperature of below 32° F. These were replaced by coils having fins used in connection with brine tanks and by the use of low pressure float valve coils which had fins attached to the evaporator coils. These fins added surface but the refrigeration coils themselves were in a good many instances not sufficiently large and numerous to maintain fin temperatures anywhere near approximating the temperatures of the tube itself. As a result the finned type coils were to quite an extent ineffective.

In addition the flat type of coils, which were in so common use a few years ago, had a considerable amount of cold hold over; that is, the ability to stay cold for some period after the refrigerating machine had shut down. In some cases hold over is a desirable quality. However, if a coil in a commercial cooler has considerable hold over and we are trying to maintain temperatures of approximately 35° F. the coils themselves will usually not warm up to temperatures above 32° F. and thus defrost before the machine is required to operate again. Thus in the use of these coils, it was necessary for the user to periodically shut the machine down for a period of from 4 to 12 hours, to allow the coils to defrost in order to maintain a good refrigeration job.

With the newer finned type coils the hold over is practically negligible, the quantity of refrigerant in the coils being very small and the surface of the coils being very great. After the refrigerating machine stops, the

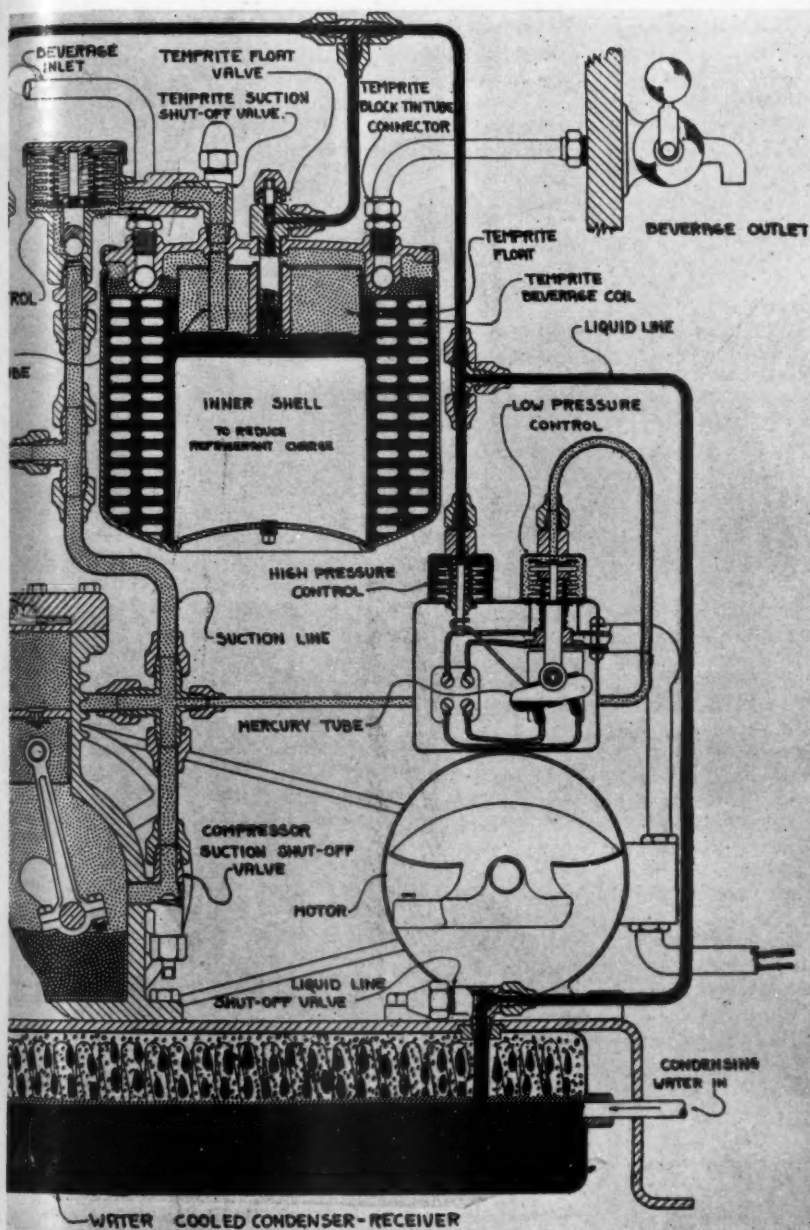
coils warm up to a temperature very nearly equal to the temperature of the surrounding air. As a result the coils defrost quickly and are ready to give a good refrigeration job again when the control starts the machine.

A further stage in the development of commercial coils is the development of the blower type of evaporator coil. This coil makes use of a condensed type of coil having very close fin spacing and having a blower mounted directly in back of the coil itself. The increased air circulation by the blower will increase the effectiveness of the coil from 5 to 15 times so that the quantity of coil for a particular job is thereby correspondingly decreased. This newer type of coil makes it possible to lower the cooler temperature down to 34° F. without the use of extremely low refrigerant temperatures and this tends to cut down the dehydration of foods which may be stored in the coolers. Care should be exercised however in coolers of this type not to have a blast of air leaving the coil turned directly against any food which is liable to dehydrate.

As far as service is concerned, the chief difference we have to consider from the service required in household and multiple apartment house systems is that we may be required to obtain two or more temperatures with the use of one condensing unit.

Temperating Valves

This will be accomplished by the use of temperating valves, two temperature snap action valves, thermostats and solenoid valves; and the lowest temperature in the system may be maintained by the control setting at the machine itself. It must be borne in mind, however, that if we have a system which contains several evaporators some of which are controlled through temperature and snap action valves or thermostats and solenoid valves, that the machine must have sufficient capacity to take care of all of these coils as well as the coldest coil on the system. Consequently when these control valves are closed, thereby discontinuing refrigeration in the warmer coils, the refrigerating unit will undoubtedly have a high capacity in conjunction with the coldest coil. For this reason it is necessary to maintain a higher differential, or more especially, a lower cut



HOOKUP WITH A FINNED TYPE COIL
SERVICE ENGINEER

out point in conjunction with the coldest coil than would be required if the condensing unit and coil size were more nearly balanced.

Thus if we were to require a brine temperature of 10° F. below zero in normal operation, having the machine balanced with the evaporator coil, it would be possible to obtain this -10° F. temperature by using a refrigerant temperature of -20° F. If the machine was thus just able to handle the coil, a pressure control setting which would give refrigerant temperatures of from -20° to -8° F. might be permissible. However, if the machine has a high capacity for the amount of coil used, it might be necessary to operate with refrigerant temperatures as low as -40° F. up to a refrigerant temperature of -8° F. and the control should be adjusted correspondingly.

The adjustment of the snap action valves should be estimated in the same way. The cut in pressure for the valve should be that which corresponds with the highest refrigerant temperature wanted in the coil. The cut out temperature may be 10° F. below the lowest evaporator temperature—if the machine has just sufficient capacity to handle the coil. If the machine is large for the coil, it may be necessary to maintain a cut of pressure which would correspond to an evaporation temperature from 20° to 30° F. below the lowest evaporating temperature desired.

Temperating valves which are usually used in conjunction with the warmest coil on the system are adjusted to maintain the lowest refrigerant temperature desired. In some instances the refrigerant temperature does not vary in this warmest coil as the pressure in the suction side of the system may never get as high as the pressure which we set the temperating valve to maintain. The temperating valve then does not close off tight but throttles the refrigerant through as refrigeration is needed in the warm coil. Thus in using a temperating valve there is a very good possibility of getting short cycling in the condensing unit unless some auxiliary device is used. This is because the refrigerant throttled through the temperating valve will soon raise the pressure on the suction side of the system and the cut on point, and if the rest of the evaporators in the system are

cold enough, the machine when it starts will lower the pressure in the suction side of the system so rapidly that the machine is shut off quickly and short cycling occurs.

One thing which may prevent this is the fact that refrigerant throttled through the temperating valve may condense in some of the colder coils. This of course while preventing short cycling is not a desirable feature as the refrigerant condensing in the colder coil warms the cold coil. In order to prevent this warming of the colder coil during the off period, a check valve is usually installed in the suction line from the colder evaporator.

Accumulator Tank

Figure 1 shows a Temprite Water Cooler hookup with a finned type coil. In this system, in order to prevent short cycling, a low pressure vapor storage tank may be installed and tee'd in to the main suction line. The larger the storage tank, the longer the cycles will be in the system which makes use of this tank. In using this low pressure vapor receiver—or we might say, a low pressure vapor accumulator—as the refrigerant is throttled through the temperating valve, it builds up the pressure in the accumulator tank until the cut in point of the control is reached, when the machine starts. As the machine operates, the pressure in the accumulator tank is lowered to the cut out pressure and at the rate the vapor is throttled through the temperating valve, some period of time is required for the pressure in the equalizer tank to be built up to the cut-in pressure again.

This type of accumulator tank is especially desirable in connection with a liquid cooler in which the liquid to be cooled passes through tubes in a bath of the liquid refrigerant. Thus in a water cooler system if no accumulator tank was used, every time a glass of water was drawn through the cooler the pressure would be built up in the compressor crank case and the control would start the machine. As the water valve is closed, the pressure would be rapidly reduced in the compressor crank case and the machine would be stopped.

In setting temperating valves to be used in conjunction with liquid coolers, the temperating valve should be set to regulate the

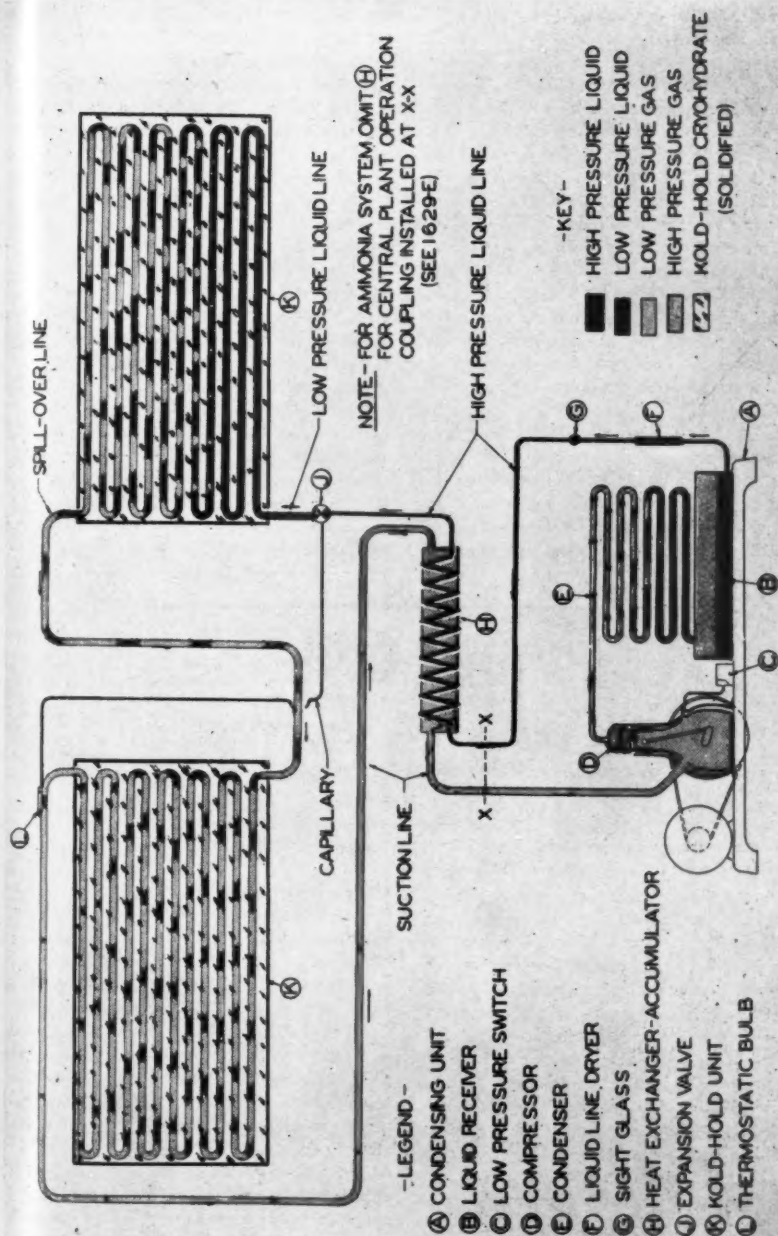


FIG. 2—SYSTEM SHOWING USE OF CONGEALING BRINE KNOWN AS A EUTECTIC SOLUTION

pressure in the evaporator to a point which corresponds to an evaporation temperature of approximately 4° F. lower than the temperature desired in the liquid to be cooled.

If the temperating valve is to be used in conjunction with a coil on which ice is to be frozen to maintain a sweet water bath at a temperature of approximately 40° F., it will be necessary to so adjust the temperating valve as to allow a quantity of ice to freeze on the coil but so as to not allow the coil to become too heavily coated with ice and thereby freeze up the sweet water bath. Generally this temperature which will maintain ice in the sweet water bath and which will not cause excessive freezing, will be evaporation temperatures of from 24° to 28° F.

In some cases temperating valves have been used in conjunction with the various individual coils in a multiple system. In this case the temperating valves are usually adjusted for a position very nearly wide open, so as to allow a low evaporation temperature. If it is found that one part of the

system does not maintain the desired temperatures, the control at the machine may be set to operate at lower pressures and thereby maintain a lower temperature as desired in one cooler. The other coolers with the new control setting might incline to run too cold. This can be eliminated by adjusting the temperating valves to limit the lowest temperature which these evaporators may reach and thus allow a variation in temperatures in the system.

Figure 2 shows a system which uses a congealing brine which we say is a eutectic solution. This solution freezes all at one temperature, the temperature depending on the materials contained in solution. These congealing tanks are used in trucks and other transports where refrigeration may be required away from a source of energy. In some cases these tanks may be frozen by hooking up to refrigerant lines connecting to a large stationary machine and in some cases the truck may carry an electric unit and simply plug into a power supply when the truck is not in use.

Cleaning Cylinders

Keep Refrigerant Cylinders Clean. It Is Not
a Difficult Job and Will Prevent Trouble.

By E. W. McGOVERN *

IN transferring refrigerants from larger containers to the smaller service sizes, clean cylinders should be used. Cylinders used only for holding pure refrigerant may easily be kept clean if they are never discharged down to atmospheric pressure. Further, a clean cylinder should not be attached to a liquid line of a refrigerating machine since a refrigerant contaminated with oil and dirt may back into the cylinder if the pressure in the latter is lower than in the liquid line of the machine. Cylinders should to receive refrigerant from machines should be kept separate and identified by a suitable paint marking.

Refrigerant withdrawn from machines is

*Engineer, R. & H. Chemicals Dept., E. I. Du Pont de Nemours & Co., Inc.

invariably contaminated with oil and may also contain moisture, acid, metal chips and other foreign materials. Oil in itself is not harmful, if it is good oil, but its presence in a cylinder indicates the probable presence of harmful contaminants. Cylinders used only for pure refrigerant may rust if they have been discharged and the valves left open, permitting moisture-laden air to enter.

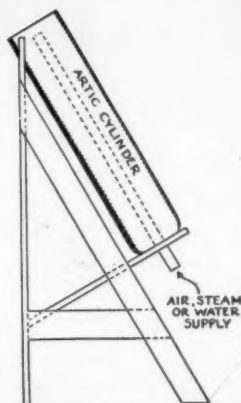
In cleaning a contaminated cylinder, oil, dirt, etc., must be removed, and the container thoroughly dried. The methods depend upon the facilities available. The various methods are listed here in the order of preference. Comments and procedures apply to refrigerants in general although precautions to avoid the presence of moisture are especially necessary in sulphur dioxide.

Before proceeding with the cleaning, discharge the contents from the inverted cylinder with the valve open wide. Care should be taken that the discharge opening is not pointing toward anyone, and that the gas is released to the outside air. Next, the valve should be removed, overhauled, cleaned, and repaired if necessary. Any fusible plugs should be replaced temporarily by plugs or corks, since the 158 degrees Fahrenheit melting point of the fusible metal is likely to be reached in treating the cylinders with steam or hot air. If in doubt as to whether or not the cylinder needs cleaning, examine the interior with the aid of a small electric bulb or pencil-type flash-light lowered into the cylinder; but residual gas should first be thoroughly flushed out with clean, dry air. If the cylinder and valve are in satisfactory condition, replace the valve and fusible plug immediately, and, if vacuum is available, evacuate the cylinder. If the container is not clean and dry, use one of the following procedures:

Soap Wash and Steaming Method

1. Place a soap solution and steel balls in the cylinder and put corks in the valve and fusible plug openings. Soap solution may be made up in the proportion of 1 ounce of soap powder to 3 quarts of water. A pint and a half of soap solution and 6 pounds of approximately $\frac{3}{4}$ -inch steel balls are sufficient for a 6-pound Methyl Chloride cylinder. Steel balls are not necessary unless there is rust or scale to be removed.
2. Roll or shake the cylinder for five minutes. Tapping cylinder while rolling will help to loosen scale or adherent dirt if steel balls are not available.
3. Invert the cylinder, placing it on a rack if one is available. Place bucket underneath to catch steel balls and soap solution on removal of cork. Be sure all balls are out.
4. Rinse the cylinder with clean water, using a hose and small pipe or copper tubing extension to reach up to the bottom of the inverted cylinder as it rests on the rack.
5. Steam the inverted cylinder until hot, using hose and pipe or tubing extension.
6. Blow the steam out of the cylinder with clean, dry air. The air may be dried by means of activated alumina, calcium chloride or quick lime (Calcium Oxide) in conjunction with a suitable filter, e.g., of fine canvas, to prevent blowing particles of the drying agent into the cylinder. Less dry air is required if it is hot.

(a) If steam and/or a sufficient supply of dry air is not available, cylinders may be dried by



PROPER POSITION OF CYLINDER FOR TREATMENT WITH STEAM, AIR OR WATER.

rinsing out with Methanol (Methyl Alcohol) to remove most of the water. A minimum of dry air is then required to remove the Methanol and remaining traces of water.

- (b) Another alternative, in case steam and/or dry air is not available, is simply to blow out the wet cylinder (after step 4) with hot air until the cylinder is dry. It is helpful to steam the cylinder first, as in step 5, if steam is available. Air may be heated in a gas-fired or steam-jacketed pipe. However, heating air does not dry it but on the contrary increases its capacity to hold water, and this method leaves the cylinder full of air containing more or less moisture which may under some circumstances, especially in the case of sulphur dioxide, be enough to be harmful.
7. Immediately replace the valve and safety plug in the cylinder. (Litharge and glycerine dope should first be applied sparingly to the valve and plug threads.) If it is desired to inspect for cleanliness before replacing the valve, examine immediately by the aid of a small light bulb. The cylinder should be clean, dry and free from loose or loosely adhering scale. Replace the valve and safety plug as soon as possible to avoid entrance of moist air into the cylinder.
8. If vacuum is available, evacuate cylinder, preferably to not less than 28-inch mercury. This insures dryness and aids in cylinder filling. Removal of water is even more effective if the cylinder is hot when evacuated. Evacuation is not absolutely necessary if steps 6 and 7 are carefully carried out to eliminate moisture.

Chlorinated Solvent Wash Method

The chlorinated hydrocarbons, trichloroethylene* and carbon tetrachloride, are strong solvents for oil and grease and may be used in place of the soap wash and steaming.

* Readily obtainable in one-gallon cans carrying the du Pont trade-mark TRI-CLENE wherever the du Pont "No. 7" Line is sold.



Showing the ample headroom and neat, sanitary installation of Fed-R-Vex Drain Baffles.

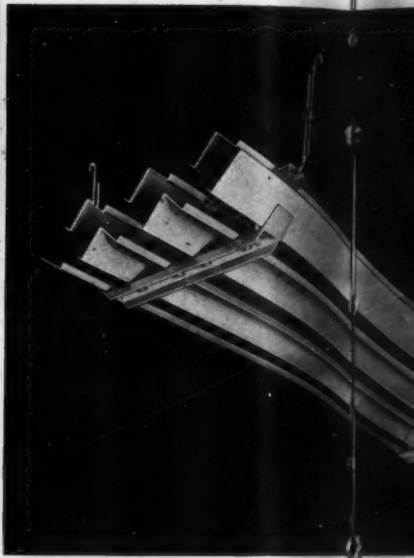
FEDDERS SUPPLIERS ARE AT YOUR SERVICE EVERYWHERE

ATLANTA, GA.
Fedders Manufacturing Co.
Leo Bosarge Refrigerating Equipment Company
BALTIMORE, MD.
Melchior, Armstrong, Dessau Co.
BOSTON, (CAMBRIDGE), MASS.
Melchior, Armstrong, Dessau Co.
BRIDGEPORT, CONN.
Parsons Bros.
BUFFALO, N. Y.
Fedders Manufacturing Co.
Beals, McCarthy & Rogers
Root-Neal & Co.
CHICAGO, ILL.
Fedders Manufacturing Co.
Airo Supply Co.
Harry Alter Supply Co.
H. W. Elythe Co.
Borg-Warner Service Parts Co.
George Monfian
H. Channon Company
CINCINNATI, OHIO
Fedders Manufacturing Co.
Merkel Brothers Co.
CLEVELAND, OHIO
Debes & Company
DALLAS, TEXAS
Fedders Manufacturing Co.
Beckett Electric Co.
DAVENPORT, IOWA
Republic Electric Co.

DAYTON, OHIO
Allied Refrigeration Co.
DENVER, COLO.
Auto Equipment Company
DETROIT, MICH.
W. C. DuComb Company
FERNWOOD, MISS.
Enochs Sales Company
GREENSBORO, N. C.
Home Appliance Service Co.
HEMPSTEAD, L. I.
Home Oil Burner Corp.
HOUSTON, TEXAS
Walter Refrigeration Supply Co.
D. C. Lingo Company
INDIANAPOLIS, IND.
Langenkamp Company
JAMAICA, L. I.
Home Oil Burner Corporation
KANSAS CITY, MO.
Forslund Pump & Machinery Co.
Natkis & Company
LONG BEACH, CALIF.
Allied Refrigeration
LOS ANGELES, CALIF.
Fedders Manufacturing Co.
Franklin G. Slagel
United Refrigeration Products Co.
LOUISVILLE, KY.
Geo. Dehler, Jr. & Co.
MACON, GA.
Lowe Electric Co.

New Fed-R-Vex are easily by ONE MAN

Refrigeration men appreciate easy Drain Baffles. They are designed to be installed in place. This makes them easy to use in close quarters, and eliminates heavy lifting overhead. The cross brackets are first placed and the drain troughs are easily set in place.



Fed-R-Vex Drain Baffles are made of permanently malleable iron, light in weight and attractive in appearance. Patented.

MEMPHIS, TENN.
United Refrigeration Supply
MINNEAPOLIS, MINN.
Refrigeration & Industrial Supply Co.
MONTGOMERY, ALA.
Teague Hardware Company
NEWARK, N. J.
T. W. Binder & Company
NEW ORLEANS, LA.
Enochs Sales Co.
NEW YORK CITY
Fedders Manufacturing Co.
Melchior, Armstrong, Dessau Co.
Harry Alter Co.
Actina Supply Co.
Paramount Electrical Supply Co.
Servicemen Supply Co., Inc.
Wholesale Radio Service Co.

PATERSO
White &
PHILADE
Melchior
PHOENIX
R. R. B
TBSU
William
PORTLAN
Sime S
Refriger
Refrig.
MOCHES
Melchior
Faulde
SACRAM
The Re

FEDDERS MANUFACTURING

New York, 114 E. 16th St.
Cincinnati, 303 E. Sixth St.

Dallas, 209 S. Pearl St.
Philadelphia, 2100 Arch St.

Chicago
Los An

Fed-R-Vex Drain Baffles

simply and quickly installed

BY ONE MAN

For easy installation of Fed-R-Vex drain baffles are designed to be assembled as they are made. It is easy for one man to install them without heavy lifting when installing them. The baffles are first placed in position . . . then easily set in place one section at a time.

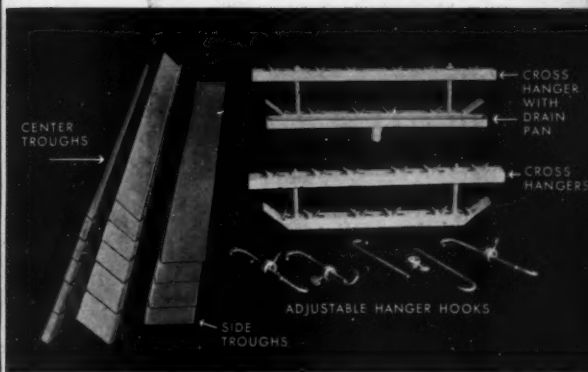
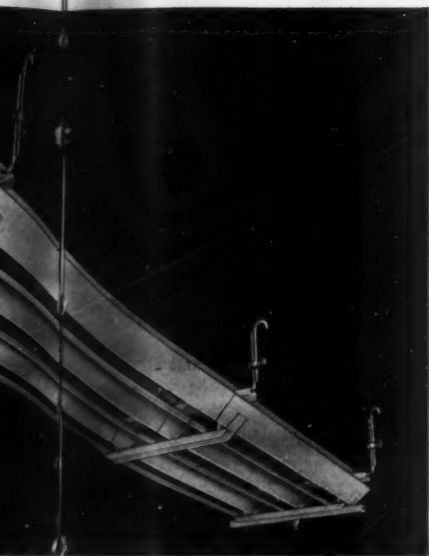
Hanger hooks are installed and adjusted by means of thumb screw clamps in a matter of seconds.

Fed-R-Vex Drain Baffles are used under natural convection coils in cases and coolers. They take up minimum headroom space and eliminate the necessity for building bunkers or special drip pans.

Fed-R-Vex design assures active circulation over the entire coil with practically no restriction to the flow of air, thus assuring more even temperature throughout the box.

The condensate, or "sweat," from the under side of the upper row of troughs drains into the lower row where it is immediately carried away.

WRITE FOR BULLETIN 102



of permanently non-rusting material. They are of appearance. Patent Pending.

Above photograph shows component parts. Instruction sheets for easy assembly included with each set.

PATERSON, N. J.
White & Shauger, Inc.
PHILADELPHIA, PA.
Welcher, Armstrong, Dessau Co.
PHOENIX, ARIZ.
E. B. Reynolds Co.
PORTLAND, ORE.
William M. Orr Co.
STONE SUPPLY CO.
Refrigerative Supply, Inc.
Refrig. & Power Specialties Co.
ROCHESTER, N. Y.
Welcher, Armstrong, Dessau Co.
Faulder's Refrigerator Parts, Inc.
SACRAMENTO, CALIF.
The Refrigeration Store

SAN ANTONIO, TEXAS
Strauss-Frank Co.
SAN FRANCISCO, CALIF.
California Refrigerator Co.
Refrigerator & Power Specialties Co.
SEATTLE, WASH.
Refrigerative Supply, Inc.
Refrigerator & Power Specialties Co.
SPRINGFIELD, ILL.
United States Electric Co.
SIOUX CITY, IOWA
Refrigeration Supply Company
SPOKANE, WASH.
E. S. Matthews, Inc.
Refrigeration Parts Supply Co.

ST. LOUIS, MO.
Harry Alter Co.
The Spangler Company
ST. PAUL, MINN.
Thermal Service Co., Inc.
SYRACUSE, N. Y.
Syracuse Supply Co.
TUCSON, ARIZ.
Glover & Clark
WILKES-BARRE, PA.
Radio Service Co.
VANCOUVER, B. C.
Fleck Bros., Ltd.
WHITE PLAINS, N. Y.
County Seat Plumbing Supply Co., Inc.

FRIG CO., BUFFALO, N. Y.

Chicago, 603 W. Washington Blvd.
Los Angeles, 1501 W. Eighth St.

Atlanta, 175 Luckie St. N.W.
Boston, 712 Beacon St.

Care should be taken in using carbon tetrachloride, for this solvent breaks down in the presence of moisture and iron, and, if the cylinder is allowed to stand before thorough drying, rust may result. It is safer to employ the non-corrosive solvent, trichlorethylene. Both are rather expensive unless a reclaim still is available. These solvents are convenient to use, but for water-soluble impurities, such as soaps, dirty water, acid, etc., soap solutions are much more efficient.

1. Place trichlorethylene or carbon tetrachloride and, if available, steel balls in the cylinder. About one quart of solvent for a 6-pound cylinder should be used although less may suffice for a comparatively clean cylinder.
2. Roll or shake cylinder for five minutes. If steel balls are not used, tapping cylinder will aid removal of scale and dirt.
3. Remove the solvent and steel balls.
4. Rinse with about one pint of clean solvent. Repeat rinse if necessary. This comparatively clean rinse solvent can be used again for the initial wash of cylinders. If the inside of the cylinder is wet with water, this may protect some of the oil and grease from the action of the solvent. In this case, the cylinder should be rinsed with about one pint of Methanol (Methyl Alcohol) after the first solvent wash. The Methanol, being a solvent for water, will effect the removal of most of the water so that the remaining oil and grease can be removed by the solvent rinse.
5. Dry the cylinder by blowing out with dry air as in step 6 of "Soap Wash and Steaming Method." Vacuum should also be used, if available, as in step 7.

Flushing with Refrigerant

As an added precaution, a cylinder may be flushed out with pure liquid refrigerant. This applies to cylinders that have been cleaned and dried as described here, as well as to cylinders that are already sufficiently clean and dry as not to require intensive cleaning.

The cylinder is connected to the stock cylinder and refrigerant introduced—about $\frac{3}{4}$ pound of methyl chloride to a 6-pound cylinder. The small cylinder is then disconnected and rolled for a few minutes. The refrigerant is next allowed to escape from the inverted cylinder after which the valve should be closed immediately.

In the case of sulphur dioxide cylinders, a very small quantity of moisture may do considerable harm. Flushing is necessary and two flushings are often used.

Flushing removes more or less moisture

depending upon the solubility of water, which in the case of methyl chloride is only about 0.2 per cent by weight. Methyl chloride is similar in solvent action to carbon tetrachloride and trichlorethylene, and dissolves oils and grease. Blowing liquid refrigerant from the inverted cylinder tends to remove solid particles small enough to pass through the valve.

Evaporation in a clean, dry flask of a sample of liquid methyl chloride run from an inverted cylinder will indicate whether or not the cylinder and refrigerant are clean. Oil, dirt or ice crystals should not show up in this test.

Service men should not heat containers to high temperatures to remove moisture and burn out impurities such as oil, although certain types of cylinders can be so treated under factory-controlled conditions. The strongest objection to this treatment is that the internal structure of the steel may be so damaged as to weaken the cylinder seriously. Paragraph 422 of the Interstate Commerce Regulations, Bureau of Explosives Pamphlet No. 9, reads as follows on this point:

"Cylinders which have been in a fire must not again be placed in service until they have been properly heat-treated and retested as prescribed in paragraph 423: Provided, That cylinders made of plain carbon steel with not over 0.25 per cent carbon need not be heat-treated, and also Acetylene cylinders need not be heat-treated if examination shows the porous filling to be unchanged and intact, and they may be used after passing the pressure test prescribed therefor."

§ § §

ASKIN'S ARTICLES PUBLISHED IN BOOK FORM

A 32-page, $8\frac{1}{2} \times 11$ " book has been recently issued by the Fedders Manufacturing Company at Buffalo, containing the series of articles by Mr. J. Askin, which have appeared in Fedders News. This practical book presents in convenient form a text book of engineering information for service men on the design and performance of Fedders products, with considerable data resulting from laboratory and field tests.

This book will make an important addition to the library of any service man.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating

equipment as well as oil burners to "The Question Box." The following questions are answered by Mr. George H. Clark.

GRUNOW

QUESTION 136. *I have a Grunow job that has a stuck pump and I would like to know if there is any way it can be taken apart and repaired and if so what is the best way to do the job and have an A-1 job when finished. This job has been apart twice by other refrigeration men. The trouble seems to be very prominent with the Grunow and I would like to know just what causes this condition so often.*

ANSWER: The Grunow compressor can be taken apart and thoroughly cleaned out and should give satisfactory service after this has been done. If the job has been taken apart by other refrigeration men and has stuck up again, I should suggest that the whole system be entirely emptied of oil and refrigerant and cleaned out as thoroughly as possible. It then should be thoroughly dried and recharged with fresh oil and fresh refrigerant and should cause no further trouble. It will be well to also check for leaks in the suction side of the system to insure that there is no air and moisture getting into the system.

The Carrene, which is used as a refrigerant, of course, operates at very low evaporating pressures; that is, in the neighborhood of 24 to 27 inch vacuum, and the pressure on the high pressure side of the system is usually about atmospheric pressure. A small leak in the low pressure part of the system might cause a gradual building up of air and moisture in the system which would do considerable harm and may be the cause of the trouble in the machine you describe. See article in the June issue.

GAS BINDING

QUESTION 137. *I would appreciate very much any information you might give me*

in regard to what is known as gas binding in a high side float.

Please explain what is meant by a gas bound float, how it is caused, what are the symptoms and how may this condition be remedied or prevented.

ANSWER: A gas bound float refers to a condition which occurs in conjunction with high side float valves. The high side float valve, of course, opens as the liquid level in the valve shell rises and closes as the liquid level in the shell falls.

If any non-condensable gas gets in the high side refrigerating system, it may be circulated through the compressor, the condenser and into the receiver or high side float chamber and, if enough of these non-condensable gases get into the high side float chamber, the pressure in that chamber may be built up sufficiently high to prevent refrigerant liquid from being forced into the chamber and, consequently, the valve will not open and meter the refrigerant into the evaporator. Also, if the temperature of the high side float chamber is higher than the condensing temperature in the condenser or receiver, the liquid will not enter the float valve or as soon as some liquid would enter the float valve chamber it would flash into a vapor at a pressure as high as the condensing pressure and thus keep the liquid refrigerant from entering the chamber and allowing the valve to work.

In general, high side float valves are equipped with a purging valve in order to purge out any non-condensable gases which may leak into or be formed in the refrigerating system and, in some cases, refrigeration is started by heating the condenser to a temperature well above that of the high side float chamber, which has a tendency to cause the liquid to get into the chamber and open the valve unless there are some non-con-

densable gases in the system. In general, this condition will be prevented when the combination receiver and high side float valve is used. However, if the refrigerant used operates at pressures lower than atmospheric pressures, the leak in the low pressure part of the system will draw air, a non-condensable gas, into the system.

With the combination receiver and float valve this merely acts to increase the condensing pressure. A further trouble that has developed in some cases concerns oil binding in the float valve. That is, the float chamber may become fairly well filled with oil which is so light that it will not cause the float valve to lift and as a result the chamber has a tendency to fill up with oil until eventually refrigerant from the evaporator is compressed and forced into the receiver when the specific gravity of the mixture of refrigerant and oil may be raised sufficiently high to cause the float valve to open and then the oil and refrigerant which has been stored in the receiver may go over to the evaporator all at one time until the level in the receiver has reached the normal.

EVAPORATOR RATINGS

QUESTION 138. *Often it is desirable to check the equipment of commercial installations to make sure that the proper size evaporators have been used. Some of these evaporators do not have model numbers or the manufacturer's name attached, so it is impossible to refer to catalogs for B.t.u. rating.*

Can you give me a simple formula that one can use to find the approximate rating of these evaporators when they are of the cross fin type?

ANSWER: It is very difficult to estimate what the B.t.u. rating of an evaporator coil may be. One method may consist in measuring the fin size and determining the total area of all the fins including, of course, both sides of each fin. Each square foot of fin area will remove approximately two B.t.u.'s per hour per degree of temperature difference between the fin and the air around the fin. This figure represents an average condition with a fin type coil. In a counter having a back bunker the air circulation is very poor around the coil with the result that the rating of the coil may be cut in two. In other words, each square foot of coil may

remove only one B.t.u. per hour per degree of temperature difference.

If the coil is located in an especially good location to set up a good current of air by the coil, this heat transfer factor may increase to approximately three B.t.u.'s per hour per square foot per degree temperature difference. It should be borne in mind, of course, that in computing the coil rating in this manner we must take into account the average fin temperature and the average air temperature passing over the fin. The refrigerant temperature while the refrigerating system is in operation will be somewhat lower than the coil temperature, the amount depending on the design of the coil. With copper fins pressed and tinned onto the tubes of the evaporator I would estimate that where the distance from the extreme point of the fin to the copper tube is not more than two inches, that the refrigerant temperature in general will be approximately 5° lower than the temperature of the fin while the machine is in operation. When the machine is not in operation, of course, the fins and the tubing and the refrigerant attain approximately the same temperatures.

If the coil has comparatively a small amount of tubing for the amount of fin, it is quite possible that the refrigerant may reach a temperature ten degrees lower than the average fin temperature while the system is in operation.

We might state that the B.t.u. rating of the coil equals the square feet of fin area times the temperature difference between the fins and air over the fins times the factor which varies from one to three, depending on the design of the refrigerator as to how it affects air circulation over the coil.

FRIGIDAIRE SWITCH

QUESTION 139. *I am having trouble servicing the old Frigidaire boxes, model F. E. 5. The trouble is on the switch. It cuts out at 16° but no matter what tension I put on the differential spring it will not cut in below 33°*

Kindly advise me as to the correct way of setting this switch. The box is about seven to eight years old and has an expansion valve for a liquid control. Is this expansion valve adjustable?

ANSWER: The trouble which you describe in connection with the control would tend to indicate that the control has partly lost its charge or that some permanent set has taken place which makes the control non-adjustable to the lower temperatures.

I would suggest replacing this control with one of the new modern replacement controls.

SERVEL HERMETIC

QUESTION 140. *I am having trouble with a Servel hermetic that someone tried to repair about a year ago. The unit runs on methyl chloride—1 pound—but SO₂ was being used. I found the capillary tubing plugged up; also the evaporator leaking like a sieve; the little liquid filter between the capillary tubing and the condenser was also dirty.*

I repaired the evaporator, installed a new capillary tube— $\frac{1}{8}$ " (old capillary tube was $\frac{3}{32}$ ")—removed the little filter between capillary tube and condenser, cleaned out, drilled a $\frac{1}{8}$ " opening for the capillary tube and charged the unit.

The unit will run about a half hour with a 20 pound back pressure; suction line will frost-back and evaporator will frost a little. Then the suction pressure will begin to drop and it will go to 20 inches of vacuum and stay there until I apply a blow torch to the capillary tubing; after a few seconds the liquid will flow through the evaporator and the back pressure will go up to 20 pounds again and operate for another half hour.

Is the capillary tube too large? If it is, why is it that when I pinch the tubing closed to try it, the suction pressure drops to about 5 pounds and no frost at all appears on the evaporator. Capillary tubing frost-back quite far and seems to freeze, because when I apply the torch it works again. Is there any kind of a chemical in the little filter, which if it escaped would cause any trouble? Because when I removed it with a torch it gave off a terrible odor, but I figured it came from the SO₂ and the hot torch.

The unit runs very good and it seems too bad to have to junk it. I am going to install a filter from an old Frigidaire and 6 ft. of $\frac{3}{32}$ -in. capillary tubing; if unit still does not work O. K., I will give up, as I am about

out of ideas. By the way, that $\frac{1}{8}$ capillary tubing is 10 ft. long. I figured that by having an opening $\frac{1}{32}$ -in. larger that if I had the tube a few feet longer it would slow up the flow of liquid enough to work but it does not seem to.

Most of these hermetic jobs are an experiment anyway, and any information on this subject will be appreciated very much.

ANSWER: The $\frac{1}{8}$ inch capillary tube 10 feet long will not furnish anywhere near enough restriction to the flow of refrigerant to make the system operate. In all probability if $\frac{1}{8}$ inch tubing was to be used 75 to 100 feet would be required in order to furnish the proper drop in pressure. I would suggest that a capillary tube having a bore of approximately $\frac{1}{64}$ inch be used and, in this case, a piece from 12 to 40 inches may be required to furnish the required drop in pressure.

It will be necessary, of course, to have a filter ahead of the capillary tube in order to prevent plugging the tube. I believe your present trouble is largely due to a mechanical freeze-up in the capillary tube. That is, when the tube is open, the refrigerant will pass through too freely and as it begins to cool down to a temperature below freezing, any moisture in the refrigerant will freeze and plug the line.

It would be advisable to thoroughly clean out and dehydrate both evaporator and condensing unit, to install the proper size capillary tube, and to recharge the system. A $\frac{1}{8}$ inch tube is not suitable as a capillary tube with the ordinary size condensing unit used in household refrigerators. If the machine is designed for methyl chloride, sulphur dioxide should not be used as the capacity of the machine with sulphur dioxide will be altogether too low.

REPLACING ISOBUTANE

QUESTION 141. *I am interested in replacing Isobutane in about twenty 1931 Copeland household refrigerators with a non-inflammable gas such as Freon. Can you inform me if this can be accomplished successfully? What changes if any must be made in our Copelands? Our Copelands use nineteen ounces of Isobutane. How much*

Freon must be used to replace the Isobutane?

ANSWER: I do not believe you can replace Isobutane with Freon in the Copeland refrigerators very successfully. These compressors run normally at a comparatively low speed and, if Freon was used, the speed would have to be decreased by one-half or the motor size would have to be doubled to keep them running at the same speed. The single cylinder compressor operating under the heavy load that would occur with Freon would have a tendency to cause vibration and possibly slipping of the belt and might even cause a flickering of lights due to the changes in current required by the motor every time the piston goes up the cylinder.

Isobutane can be replaced by sulphur dioxide with practically no changes in the machine other than a thorough cleaning out and drying of the system before the sulphur diox-

ide is put in. Sulphur dioxide, of course, requires the system to be completely dried and fresh oil used, or trouble is sure to result. In a number of cases Isobutane has been replaced with methyl chloride in which case the motor pulley should be reduced to approximately $\frac{2}{3}$ of its former diameter so as to run the compressor slower with the methyl chloride. It would be necessary, also, if either methyl chloride or Freon were used, to check the seal spring to insure that the seal would not open up at the higher pressures which might obtain in the crank case. The seal should be tested to 80 pounds gage pressure when used with methyl chloride and to approximately 100 pounds gage pressure when used with Freon. $2\frac{1}{2}$ pounds of sulphur dioxide or Freon have approximately the same value as 1 pound of Isobutane. However, $1\frac{1}{2}$ pound of either refrigerant is sufficient to take care of any of these expansion valve systems.

NEW MECHANICAL DEVICES Service Tools and Special Equipment

Under this heading there will be published illustrated descriptions of new or improved service tools and equipment for the Service Engineer. Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

NEW WHEEL PULLER

PLOMB Tool Company, manufacturers of hand-forged tools, have recently developed two small gear pullers which are proving very valuable in the servicing of refrigeration and radio equipment.



One of the important uses of these tools is in pulling compressor pulleys of refrigeration units. Either the 2-jaw or 3-jaw tool does this work very quickly and efficiently. Jaws are hooked into position, the adjusting nut spun down to lock them in place, and a few turns of the screw loosens the pulley and removes it without injury to shaft or pulley.

These two pullers (No. 4060 with 2 jaws and No. 4070 with 3 jaws) have a capacity of 0 to $1\frac{1}{2}$ " with the short $3\frac{1}{2}$ " jaws and 0 to 3" with the larger $4\frac{1}{2}$ " jaws. The No. 4070 3-jaw puller is slightly higher in cost, but centers more readily on the work and gives a straight, even pull without tipping to one side.

§ § §

NEW ROTARY SEAL BULLETINS

SEVERAL bulletins have been issued recently by the Rotary Seal Company, man-

ufacturers of Rotary replacement seals. One of these bulletins entitled, "Up and Up!" has been prepared for distribution by jobbers to service men to show the ease with which installations of Rotary seals can be made.

A larger folder clearly illustrates the typical applications where this seal can be used in addition to a complete list of sizes available for their application.

MINNEAPOLIS-HONEYWELL CONTINUES TO SELL FOR THE INDUSTRY

It has long been the practice of Minneapolis-Honeywell to sell the public upon the advantages of Automatic Heating and Air Conditioning through its advertising in national magazines and newspapers, and to further urge those interested to "See Your Dealer."

Their advertising in 1936 is no exception to this rule. They began the year with a campaign in several of the leading national publications, and have now released information regarding their plans for the balance of the year.

Beginning in August, the amount of national advertising will be materially increased. It will include a continuation of the strong series of advertisements started early this year in *Time*, *Nation's Business*, *Business Week*, *American Home*, and *Collier's* magazines. To that group will be added an important schedule in the *Saturday Evening Post*, *House Beautiful*, and one or two other magazines.

In addition they will use nearly one hundred thousand lines of newspaper advertising in over thirty newspapers in the principal metropolitan centers. Thus every part of the country will be reached by some of the fifty-four million consumer messages of which this advertising schedule consists, although the major portion of the emphasis is being placed in those sections where there is the greatest population, and in consequence the greatest number of possible prospects for heating, ventilating, and air conditioning equipment. From beginning to end the copy in the advertisements will emphasize the advantages of immediate installation of automatic heating and air conditioning,

with strong emphasis upon the importance of the dealer and the desirability of calling upon the dealer for information and installation.

In other words, this entire campaign, like its predecessors, is aimed at doing a real job of selling for the dealer.

Along with this powerful advertising plan is going a continuance of the hundreds of local meetings which their widespread organization of thoroughly trained factory men are continually conducting for the education of salesmen and servicemen, and for the purpose of assisting all of them to do a more thorough job of selling Automatic Heat and Air Conditioning. Such meetings, for which Minneapolis-Honeywell personnel is always available, will include in addition to the usual helpful information, the presentation of special Fall dealer sales helps which are a part of the Minneapolis-Honeywell plan for this year's publicity. Such dealer helps will this year take the form of window and counter display material, in addition to the usual ample supply of consumer folders and printed matter, most of which is supplied the dealer without cost.

Minneapolis-Honeywell is extending a real service to the industry in their thorough-going plan of national advertising on behalf of the industry.

A NEW CATALOG OF HAND TOOLS

KNOWN as Catalog No. 36, the Bonney Forge and Tool Works, Allentown, Pa., has just issued a 56 page book showing a complete line of hand tools for refrigeration, automotive and industrial use, and it is now being distributed to their jobbers and the jobbers' salesmen.

This manufacturer states the line has been considerably broadened—many new items having been added in the last year.

The book illustrates in detail and describes a full line of Sockets with handles and attachments in $\frac{1}{2}$ ", $\frac{3}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{16}$ " and 1" square drives, extra-deep sockets, drain plug squares, special sockets, solid socket wrenches, box, engineers and tappet wrenches in Zenel and "CV" chrome-vana-

(Continued on page 56)

The REFRIGERATION SERVICE ENGINEER

A Monthly Illustrated Journal, Devoted to the Interests of the Engineer Servicing Refrigeration Units, Oil Burners and other Household Equipment.

Vol. 4 July, 1936 No. 7

RATES OF SUBSCRIPTION

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Official Organ

REFRIGERATION SERVICE ENGINEERS' SOCIETY

IT'S JUST A START

EXPERIENCE is the basis on which we chart our course for future sailing. Experience comes costly at times, but its true value is never determined until we apply this experience to our future advancement. The refrigeration business, both as to service and sales, has certainly a wealth of experience to base its future activity on, even when we consider the comparatively brief period of the activity of the industry as compared to other industries dating back many years before the advent of the small refrigerating machine. Much of this experience has been crammed into an incredibly short period of time.

No one will deny the progress which the refrigeration service business has made. But it is only a start—yet it can be recorded here that the future can be faced with a sense of security.

The opinion that the service end of the business is more or less of a necessary evil still is prevalent among those outside of the service department. For the sake of argument, we will assume that this is the case. But it is certainly an undeniable fact that this end of the business is as definitely in the picture as is manufacturing and selling.

In fact, there can be only a close rela-

tionship between sales and service. The service department is in an ideal position to supplement the work of the sales department, and is willing to work to that end. The service department is in contact most frequently with potential customers, and is in a position to develop sales. It is imperative that the sales department recognize this fact. Independent operators can account for many sales, and will become a greater factor as replacement jobs become inevitably necessary.

THE REFRIGERATION SERVICE ENGINEER is concerned with the path of advancement to be traveled by the service profession and its efforts are directed in behalf of those men who are interested in seeing that this industry is established on a business-like basis. The stability of the business is becoming more and more apparent.

Those who are legitimately in the business to render a real service, are going to protect their interests, and those who are unwilling to assist in establishing this standard will find that the business holds little for them.

FAKE SOLICITORS

RECENT reports to the publishers of THE REFRIGERATION SERVICE ENGINEER indicate a renewed activity by fake subscription solicitors, who have been successful in securing remittances for subscriptions under false pretenses.

One such instance reported, indicates the activity of one who identifies himself as a Mr. Burton of Elmira, New York, who offers bargain rates from the established subscription price of \$2.00 per year. He is described as being 5 ft. 8 in. tall, weight 140 lbs. and wears glasses.

Any attempt by this impostor to solicit subscriptions should be reported promptly to the publishers. Any authorized agent of Nickerson and Collins Co., publishers of THE REFRIGERATION SERVICE ENGINEER, can produce credentials upon request.

R. Ladon
Texas

So as not to miss an issue, here is my renewal. It certainly is well worth the small cost.

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.



THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; with special reference to servicing and installation of domestic and small commercial equipment; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.

Memphis All Set for Convention

PRACTICALLY all that remains some four months in advance of the 3rd Annual Convention of the R.S.E.S. is your "personal attendance" to partake of real "Southern Hospitality."

Mr. George Uetz, president of Memphis Chapter, and his local committees, as well as Second Vice-president W. Hall Moss of the National Society, are to be congratulated on the efficient and thorough manner in which all details have been planned and carried out attendant to a meeting of this importance.

The educational program is being planned to provide a practical three-day intensive discourse on the developments of refrigeration equipment and accessories which have occurred in the past year, and the future aspects of the servicing business.

The exhibit of the leading manufacturers will provide an important educational feature in that, displayed under one roof will

be the products of the leading manufacturers with experienced engineers in charge to provide authentic information relative to their products.

As an indication of the importance of this educational part of the 3rd Annual Convention, all space in the general exhibits has been reserved, and while additional space has been provided, approximately 50% of this additional space is now also reserved.

Beginning on Wednesday, November 11, every moment of the delegates' time will be occupied to provide not only educational instruction, but entertainment for all, including three days of activity for the ladies.

November is an ideal time to plan for a real convention, and Memphis should be your objective. A cordial invitation is extended to all interested in refrigeration to attend this important refrigeration convention. The dates—November 11, 12 and 13.

Three New Chapters Being Formed

ONTARIO MAPLE LEAF CHAPTER Toronto, Ontario

OUR brother service men across the border, recognizing the advantages of co-operative educational efforts in behalf of the servicing profession, met in the King George Hotel, Toronto, Ontario, on June 19

to learn of the work of the Refrigeration Service Engineer's Society.

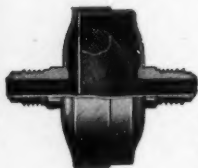
The meeting was called to order by Temporary Chairman A. E. Doan, who outlined briefly the purpose of the meeting and introduced National Secretary H. T. McDermott, who acknowledged his appreciation of

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TYPE 890 SMALL STRAINER

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Dehydrator With Dispersion Tube

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the opportunity of meeting with this group and then proceeded to outline the purposes and objects of the Society and the benefits of a local chapter, and invited the participation of the service men of Toronto and vicinity in the activities of the National Society. After a discussion participated in by those interested in the formation of a local organization, it was voted to apply for a charter. In order to carry through the work of the local chapter during its formative period, Mr. A. E. Doan was formally elected as Temporary Chairman and Mr. H. F. Nye as Temporary Secretary.

The matter of the adoption of a constitution and by-laws for the guidance of the local chapter was referred to a committee appointed by the Chairman, who requested that a report be given at the next meeting at which time final details of the chapter will be worked out.

The Ontario Maple Leaf Chapter will include a large territory in the province of Ontario, and service men interested in identifying themselves with this chapter are requested to communicate with either Mr. A. E. Doan, temporary chairman, at 108 Bathurst St., Toronto, or Mr. H. F. Nye, 82 Ontario Street, Toronto.

Further reports of the activity of our first Canadian chapter will be published in subsequent issues of THE REFRIGERATION SERVICE ENGINEER.

ROCHESTER CHAPTER

At a meeting held at the Seneca Hotel on June 22 a group of service men met with National Secretary H. T. McDermott to consider plans for the formation of Rochester Chapter. Plans were made to

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secure the interest of all service men in this city to become actively identified with this new chapter, and in carrying out the work of the chapter during its formative period the following temporary officers were selected:

Temporary President—C. D. Pennington.
Temporary Secretary—Miss I. Rocklin,
care of Pfaudler's Refg. Parts, Inc.

A general discussion took place as to how the chapter could serve the individual membership and it is the hope of this group to enlist the membership of every active service man in Rochester and vicinity.

SYRACUSE CHAPTER

A REPRESENTATIVE gathering of service men was present on June 23 at the meeting room donated through the courtesy of the Syracuse Supply Company to learn of the operation and activities of the R.S.E.S. as outlined by National Secretary H. T. McDermott.

Mr. Percy Ridings, general manager of the Syracuse Supply Company, welcomed the service men to the meeting and introduced the National Secretary. After consideration by those present of the many advantages that a local chapter would offer to the service men in providing for a co-operative effort to further the interests of this group, it was decided to apply for a charter for a local chapter. The following officers were selected to serve temporarily during the formative period until the formal receipt of the charter.

Temporary President—Carl Stewart.
Temporary Secretary—F. G. Mackin.
Temporary Treasurer—Fritz Harder.

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CARL SCHNEIDER CO.

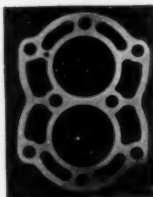
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Buffalo, Binghamton and Cincinnati Receive Charters

AT a special meeting called on June 24, Binghamton Chapter was formally presented with its charter. President F. C. Landon called the meeting to order, stating that the chapter was pleased to have with them National Secretary H. T. McDermott, who was present for the purpose of officially presenting the charter to the chapter.

The meeting was attended by practically every member, and after the presentation formality, a round-table discussion was held to ascertain the best method of increasing the chapter membership and to consider future plans for the activities of the chapter to serve its membership.

The meeting adjourned, and an excellent buffet lunch was provided for the members and guests.

CINCINNATI CHAPTER

At a special meeting held on July 1 at the

offices of Merkel Brothers Company, Second Vice-president R. B. Howard introduced National Secretary H. T. McDermott and stated that the reason for the special meeting was to receive the charter of Cincinnati Chapter. At this meeting plans were discussed to secure a permanent meeting place and to adopt methods to increase the interest in Cincinnati Chapter. Following the charter presentation and general discussion, the meeting adjourned to partake of a buffet lunch and refreshments.

NIAGARA FRONTIER CHAPTER

Charter Presentation Meeting, June 18th

THE meeting was called to order and a brief outline of the proceedings was given to those assembled. President D. B.

KRUPP WATER REGULATOR STYLE "F" for Methyl- Freon-Sulphur



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The above list is partial. Write for free complete catalogue of courses.

STUDY SYSTEMS

1819 Broadway

New York, N. Y.

Schuster requested George E. Wilson, Second Vice-president, to act as chairman of the meeting who instructed the Sergeant-at-Arms to have the Reception Committee accompany our National Secretary—Mr. H. T. McDermott—to the banquet hall, where he was introduced to those assembled by Mr. Boneberg, chairman of the Reception Committee. Mr. McDermott then took over the meeting and addressed those assembled, giving them an outline of the formation of the Society, its purposes and its ideals, and administered the oath of office to the officers and members.

After dinner Mr. Mayer, acting secretary of the Buffalo Engineering Association, welcomed the new society and outlined and suggested a plan whereby Niagara Frontier Chapter could become one of the group of associated engineering societies composing the Buffalo Engineering Society. Mr. Boneberg, who conceived and helped form the first service engineering activities in this locality, spoke on behalf of the former society of the Refrigeration Service Engineers. Mr. Fred Cameron, vice-president of the former

Buffalo Service Engineering Society, spoke on behalf of that organization. Mr. Schuster, president of the Niagara Frontier Chapter, gave a talk outlining the progress made by the society and its policy for the future. Mr. Wm. Powell, secretary of the Niagara Frontier Chapter, who has been active in all three of the above service organizations, gave a very comprehensive talk outlining the activities of the service men in this vicinity from the time of the formation of the original society of Mr. Boneberg's up to and including the formation of the Niagara Frontier Chapter. Mr. Wolfe, who was temporary president during the formation of the Niagara Frontier Chapter, gave a description of the work of the committees in the formation of this chapter.

Mr. Joe Askin, chief engineer of the Fedders Manufacturing Company, and honorary educational director of the Niagara Frontier Chapter, suggested and outlined a policy for the educational activities of this chapter as well as speaking on behalf of the Fedders Manufacturing Company, which firm he represented. Mr. Chas. Rittling of the Fedders

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Manufacturing Company spoke regarding the close co-operation that exists between his firm and the service engineers. Mr. Harold Childs, representing the Household Utilities, Grunow distributors, gave a brief talk relative to the co-operation of his firm. Mr. Andriac, service engineer of the Household Utilities, briefly summarized what Mr. Childs had said expressing appreciation of the close co-operation of the service engineers in this vicinity. Mr. Brooks, representing Root, Neal & Co., gave a talk welcoming the formation of the Society on behalf of the firm he represents. Mr. Adair of Root, Neal & Co. summarized Mr. Brooks' talk and promised the co-operation of his firm and himself in furthering the interests of the Society. Mr. Schultz of Beals, McCarthy & Rogers spoke on behalf of his firm and pointed out that close co-operation and attendance at meetings were necessary for the success of any society. Mr. Tom Bowie, representing the Cooler Keg Co., a newcomer in this territory, thanked the Society for the opportunity presented to him to become acquainted with the members. Mr. George

O'Heara spoke on behalf of the suggestions offered by Mrs. O'Heara relative to the forming of a Women's Auxiliary.

Our National Secretary gave a very enlightening and interesting discourse on service activities as a whole throughout the country. This was the closing address of the evening.

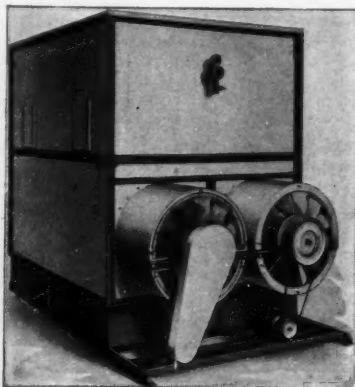
The Chairman of the Banquet Committee then turned the meeting over to our President—Mr. Schuster—who conducted an informal open forum.

The Banquet Committee wishes to express its appreciation to Mr. Pagel of the Household Utilities for sending Mr. Childs to represent him due to his inability to be present, and likewise for the loan of the Grunow radio.

Our appreciation is likewise expressed to the Fedders Manufacturing Co., who through their representative, Mr. Askin, donated the refreshments that were served during the open forum conducted by Mr. Schuster, our president.

We look forward to many more successful meetings like this one.

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CLEVELAND CHAPTER

Meeting of May 6, 1936

By ED VADAKIN, President

16814 Kinsman Road, Cleveland, Ohio

DUE to the resignation of Mr. George J. Schuld as president of Cleveland Chapter, Mr. Ed Vadakin was elected president, and as Mr. K. P. Wall due to a change of occupation resigned as secretary, Mr. Tom Sutton was elected to this position.

A discussion of the Detroit licensing ordinance was held and Mr. J. H. Downs was requested to read a copy of the ordinance at a future meeting.

A delegation of Cleveland Chapter members attended the meeting on May 7 of Akron Chapter, and the members who participated in this visit included: Messrs. Farr, Wall, Pottenger, Downs, Husted and Vadakin. A delegation from Youngstown Chapter was also present and heard a very interesting talk on lubricating oils.

Our National Secretary—H. T. McDermott—was also in attendance at this meeting.

Meeting of May 27, 1936

At this meeting, called to order by Presi-

dent E. Vadakin, the Detroit licensing ordinance was read by J. H. Downs, and a letter was proposed to be sent to all of the members of Cleveland Chapter requesting them to indicate the night of the week which would be most convenient to the majority of members to meet. This letter contained a return postal card on which each member could indicate his preference.

President Vadakin also appointed standing committees consisting of the following, the first name on each committee to serve as chairman:

Educational Committee—Z. Kelly, J. H. Stubbs, H. A. Leatherman

Membership Committee—G. Keller, J. H. Downs, G. Schuld

Entertainment Committee—C. Husted, T. Metzler, H. V. Smith

Welfare Committee—G. Tiedt, R. Chown, A. Finke

Grievance Committee—L. E. Gardella, F. Schuld, F. Szkula

Auditing Committee—O. Sippel, Louis Gardella, C. Debes

Standards Committee—G. Schuld, T. Sutton, W. W. Farr

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1477 Merchandise Mart, Reg. Dept., Chicago

Mr. Dan Wile was the speaker of the evening, giving an interesting talk on thermostatic expansion valves, as well as a practical demonstration of a simple method of testing valves.

A number of visitors were present from Nela Park, Williams & Co., and The Detroit Lubricator Co.

Some of the tentative educational talks for future meetings will include the following: R. E. Stolz will talk on his invention of a thermal snap valve; talk on field service of General Electric units by a representative of the company; lecture on Russ Soda Fountains, hook-ups and field service; and a lecture on cold controls by a representative of Ranco. Other subjects which will come up for discussion of interest to all service men will include a discussion on whether or not a licensing act similar to the Detroit ordinance is advisable for Cleveland; do we want the 1937 R.S.E.S. convention, and how shall new members be classified. These are subjects of importance to Cleveland service men, who are invited to attend the meetings.

CHICAGO CHAPTER

Meeting of June 9, 1936

By H. D. BUSBY, Secretary
5611 Lawrence Ave., Chicago, Ill.

THE meeting was called to order at 8:30

P. M. Officers present were: Messrs. Jacobsen, Skipple, Roth, Busby and Bossert.

Mr. William Drake, president of the newly formed Indianapolis Chapter, was a guest for the evening and exchanged with our members some very interesting highlights on business conditions in Indianapolis.

Mr. Jacobsen gave a brief account of a recent trip made by him and Mr. McDermott to Memphis to look over the 1936 convention arrangements. The prospects, as outlined by Mr. Jacobsen and also Mr. McDermott, promise a very interesting convention for members and their wives.

In calling for subjects of discussion from various members, the subject of license laws was immediately brought up. A motion was made by Mr. Drownes that Chicago Chapter

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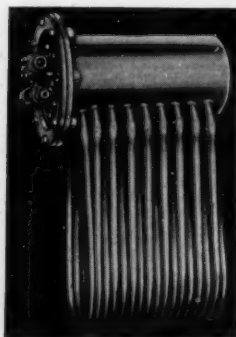
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go on record as being in favor of a license law which would license all present mechanics serving in the field. The motion was seconded by Mr. Vanston and duly carried.

Since the subject of licensing is a very interesting and vital one at this time and it is generally felt that the R.S.E.S. as a group should have a hand in its formation, it was suggested that some of the present license laws in operation in other cities be read and discussed at the next and subsequent meetings.

Mr. Vanston asked that some educational matter on the city code laws be arranged for future meetings.

Volunteers were called for to be placed on a committee in charge of outlining a license law which would meet with the approval of our Society, and the following members volunteered: Messrs. Vanston, Corso, Logemann and Hendrickson.

Mr. McDermott announced that standardized service forms of the type printed in our monthly magazine are now available from the offices of the National Secretary.

Meeting of June 23, 1936

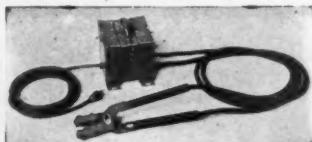
The meeting was called to order at 8:50 P. M. Officers present were: Messrs. Jacobsen, Skipple, Armstrong, Busby and Bosser.

There being no business for the evening, the meeting was immediately turned over to educational purposes. Licensing laws and codes in operation in other cities were read and discussed at some length to the end that a proposal was made that all future activities of this Chapter be confined to educational matter aimed at keeping members informed of the developments and the understanding of the licensing laws in this city. This was deemed advisable inasmuch as we are purely an educational body with no political aims or connections.

Chas. L. Cooper,
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CAPITAL CITY CHAPTER

Meeting of June 19, 1936

THE meeting of Capital City Chapter held on the evening of June 19, was called for the election of permanent officers for the current year. The result was as follows:

President—M. H. Hamilton.

Vice-president—Carl Robinson.

Secretary-Treasurer—Chas. W. Lund.

Sergeant-at-Arms—Bradley Gosnell.

A vote of thanks was tendered to Mr. S. L. Price for his efforts in the organization of the chapter. An active membership campaign is now on to double the membership of the chapter. All service men in the vicinity of Washington, D. C., are invited to affiliate with this chapter. Information as to meeting nights can be secured from Mr. Chas. W. Lund, secretary-treasurer, at 2337 Third St., N. E., Washington, D. C.

§ § §

ST. LOUIS CHAPTER

Meeting of May 28, 1936

By E. A. PLESSKOTT, President
2145—67th St., St. Louis, Mo.

THE regular meeting of St. Louis Chapter held at the Crunden Branch Library, Thursday, May 28, was called to order by President Plesskott at 8:20 P. M.

There being no business, the meeting was turned over to Mr. Gyga, who introduced Mr. J. M. Dunser of the Chase Brass & Copper Co., our speaker of the evening.

Mr. Dunser gave a comprehensive outline of their line of sweat fittings and with the help of his assistant, Mr. George McDougall, his expert solderer, demonstrated the ease and strength of this type of joint. A small assembly was made up in the shape of a T, using one-half inch fittings and tubing, and capping up the cross members. This was put to a test of three thousand pounds hydrostatic pressure and withstood it with strength to spare.

Mr. Gyga gave a brief demonstration of the Curtis service unit that was used in the soldering of these joints. He pointed out the many other uses to which this little outfit can be put.

Mr. Plesskott advised the members of his inability to be present at the next meeting and also that the meeting of June 25th may

be in the nature of a dinner (a Dutch treat) at Garavellis' air-conditioned restaurant, Mr. Gyga to make arrangements for the speaker and Mr. Nettler to get information as to cost and report at the meeting of June 9th, and if agreeable to the majority we might hold one meeting of each month at Garavellis' during the hot spell, and the other at our regular meeting place.

Meeting of June 11

The regular meeting of St. Louis Chapter held at the Auditorium Hotel, was called to order by Vice-president Nettler at 8:30 P. M.

No business appearing, Mr. Gyga, educational chairman, introduced Mr. Fred W. Powers of the Century Electric Company, who gave a most comprehensive talk on Whitaker-Upp electrical power systems for mechanically refrigerated trucks and trailers. In this he was ably assisted by Mr. Al Brown.

He gave a complete outline of the possibilities of this type of equipment and gave it as his opinion that the transcontinental busses would very soon be using it for air conditioning purposes to compete with railroads in the matter of comfort. The system on display and in operation was examined in detail by practically every one present. Various questions on adaptability, service pointers, etc., were fully answered by Mr. Power.

Meeting of June 25, 1936

The minutes of the June 9th meeting were read and approved, and for the benefit of those unable to attend that meeting, a complete outline prepared by Mr. Gyga was also read.

Discussion on the advisability of curtailing our meetings during the hot summer months and changing the location of them resulted in motions that we meet on the 4th Thursday only during the months of July and August, and that these meetings be held at Joe Garavellis'. A dinner is to be arranged to start off the evenings. Motions carried unanimously. It was suggested that a letter with return postal card enclosed be mailed to all members advising them of our summer schedule and to enable them to make reservations for the dinner to precede these meetings.

The membership was requested to make known at the next meeting, if possible, if

Just Off the Press

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1936 **IMPERIAL**
CATALOG

MANY new items are offered among the refrigerator parts, valves, fittings and appliances; also a full line of oil-burner parts and equipment. New units of varied types and new service tools. All items fully illustrated.



No. 174-F

Imperial Tube Cutter

The tube rests against twin rollers in which is a vertical groove; see A in sketch. When it is desired to remove the flare only, it is fitted into the groove, and the blade leaves the rest of the tube untouched.

No. 174-F, Tube Cutter. Takes all tubing from $\frac{3}{16}$ " to $\frac{3}{4}$ ". Each... **\$2.75**



Write for Catalog 77-E.
Place your orders
through your jobber.

IMPERIAL BRASS MFG. CO.
1200 W. Harrison St. CHICAGO



Typical examples of the up-to-date character of the Imperial line are found among the service tools. One of these is the "flare-holding groove" in tube cutter No. 174-F.

MILLS

COMPRESSORS

for Commercial Use

Mills Novelty Co. • 4100 Fullerton Ave. • Chicago, Ill.

arrangements should be made for a picnic.

Mr. Gygax spoke briefly on a new application of refrigeration, namely, the "DX" system, a method of removing moisture from natural or artificial gas.

Mr. Krueger gave a short talk on two new dehydrating agents—soda lime and "Drierite." The latter of these should prove very popular if it will do all he says it will.

Mr. Plesskott requested all new members who had made partial payments to try to clear these up before the end of the month in order to enable us to get credit for these new applications in the Membership Drive. He also requested that we continue our efforts in behalf of obtaining new members throughout the year, because it is only in proportion to our representation that we can begin to have a voice in the affairs of this city pertaining to our line of work or in our own National Council.

MEMBERSHIP DRIVE CONTEST

THE finish. Here are the winners:

1st Prize—Chicago Chapter, Paul Jacobsen, president. \$25.00.

2nd Prize—Memphis Chapter, G. L. Uetz, president. \$15.00.

3rd Prize—Kansas City Chapter, R. E. Cox, president. \$10.00.

This is the order in which the finish was recorded in the Membership Drive participated in by the chapters since January 1 and ending June 30.

Our congratulations to the winners, and our best wishes to the other chapters for better luck next time.

A friendly rivalry prevailed during the membership race, and while this officially closes the first Membership Drive, we know that each chapter will continue its efforts to increase its local chapter membership.



Door Gasket Replacements Open New Fields of PROFIT

Hundreds of thousands of refrigerators were sold five years ago. Now they need new door gaskets.

Miller has simplified gasket types to 20 that will service 80% of all refrigerators made to date.

Send for special illustrated price list.

You can make money with Miller Refrigerator Gaskets. If your local jobber cannot supply you, write direct. Miller Rubber Company, Inc., Akron, Ohio, U. S. A.

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Condensing Unit
Style D7-MA



STARR FREEZE

DEPENDABLE COMPRESSORS AND CONDENSING
UNITS

1-2-4 Cylinders— $\frac{1}{8}$ to 10 H.P.

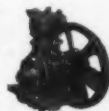
The most profitable and complete line to select from—just the size to build that refrigerator,—to assemble that condensing unit or to replace that old worn-out compressor.

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Style J

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Just the equipment necessary for use by Refrigerator Service Men on emergency jobs. Compact, inexpensive, light in weight and convenient to take along. When in position interior of mask is sealed against outside contaminated air. Comes supplied with individual cartridges for ammonia, sulphur dioxide and methyl chloride. Write for full facts and literature.

**Chicago Eye Shield Company, 2341 WARREN BOULEVARD
CHICAGO, ILLINOIS**

PITTSBURGH CHAPTER

Meeting of June 8, 1936

By F. V. GOLITZ, Secretary
1518 Davis Ave., Pittsburgh, Pa.

THE regular meeting of the Pittsburgh Chapter was held in the Crafts Building on June 8, President C. O. McCauley presiding.

The minutes of the last meeting were read and accepted as read by the Secretary.

Due to the small number present the meeting was turned into an informal discussion of many interesting subjects. Some of the topics discussed were: Hermetic units, absorption units, and obsolete models. Questions were asked and answered by the members. This meeting proved both instructive and interesting to all those present.

§ § §

"THE 'CONTRIBS' COLYUM"

By THE KINGFISH

WE hear that our very good friend K. P. Wall of Cleveland, Ohio, has become manager of Harry Alter's branch in that city, and that he recently made a trip to Chicago. We also hear that he and McDermott spent an evening in Paul Jacobsen's home and sat in the den talking about convention news and the general outlook for this season.

The Kingfish paid a visit to this same Paul Jacobsen the other day and found out that some members wanted to know our identity. Well, we are the Kingfish of that great fraternity called "The Order of the Unknown Colyum Contributors"—a fraternity where the boys and girls send in their complaints or comments, and in return receive a soothing letter or talk—possibly a gentle pat on

the back, or a get-together at a little party some evening.

The Kingfish is the great peace-maker who sees to it that all of his friends are on good terms.

You ought to join this great fraternity—no dues—no obligations—meetings by mail whenever you like—and one personal meeting once a year at the annual convention.

Send in your thoughts to the Kingfish—433 N. Waller Ave., Chicago, Ill.

We hear that McDermott and Jacobsen were in Memphis to put the O. K. on the convention committees' work, and that they expressed their satisfaction with the results that the boys and ladies in Memphis have accomplished.

We are wondering how the springs stood up in Mr. Moss' coupe when he, Mac and Paul (the three heavyweights of the R.S.E.S.) were riding around in Memphis and Arkansas. We also hear that they tried a new game which consists of a gallon jug full of water with a small jar standing inside it—this small jar having a mouth opening of about one inch. The trick is to drop pennies or dimes down through the water so that they fall into the small jar. If they miss, you lose.

Down the grapevine comes the rumor that "Bill" Drake, president of Indianapolis Chapter, learned to eat "Cannibal" sandwiches when he was in Chicago a short time ago. We are informed that he attended a meeting of Chicago Chapter and that some of the boys took him to a place called "Potthast," and there they had beer and raw hamburgers. Is that right, Bill?

Cash In ON FILTERPURE

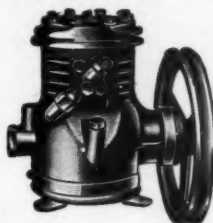


- ✓ Installed in a minute's time in counter cases and reach-in boxes.
- ✓ Lowers temperature 8 to 12 degrees.
- ✓ Stops sweating.
- ✓ No taste transfer. You can place fish next to meat in absolute safety.
- ✓ Maintains color and firmness of meats.
- ✓ Uniform temperature and humidity.
- ✓ Retailers for \$29.50

Filterpure is the fastest selling article ever introduced in the refrigeration field. It is the "missing link" to 100% refrigeration. See your Jobber today.

BETZ CORPORATION BETZ BUILDING Hammond, Ind.

"Chieftain" Quality Built Compressors and Condensing Units



See Your Jobber

For Literature and Prices on Our Complete Line

Save money by installing "Chieftain" Compressors instead of trying to satisfy exacting customers with rebuilt compressors or condensing units.

"Chieftain" Compressors are made to last. Precision limits are maintained on all parts. Our new and exclusive lubrication system insures longer life and higher efficiency, as well as a quiet operating unit.

In addition to quality we offer prices that will permit you to make a higher percentage of profit as well as a saving of time, which will enable you to satisfactorily handle a larger volume of business.

TECUMSEH PRODUCTS COMPANY, Tecumseh, Michigan
Refrigeration Division

SERVICE DOESN'T FALTER WHEN IT COMES FROM HARRY ALTER

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WHEN THE TEMPERATURE SOARS—
DEPEND ON US FOR FAST SERVICE

REFRIGERATION PARTS and SUPPLIES

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If you are engaged in the business of servicing or selling refrigeration you should have a copy of our new 96 page SUMMER catalog. Write today on your letterhead. We sell to the trade only.

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provides sub-zero
temperatures and still
maintains above-
atmospheric pressures

V-METH-L (Virginia methyl chloride) is not corrosive to copper or iron—permits the use of flanged copper tubing—its weight per cubic foot is small compared with weights of similar refrigerants, hence the cost of charging with V-METH-L is considerably less. V-METH-L, made by the makers of Extra Dry ESOTOO, is shipped from 69 distribution points for prompt delivery.

Virginia Smelting Co. West Norfolk, Va.

Please send me literature on electric refrigeration checked below.

- ☐ Folder: V-METH-L (Virginia methyl chloride)
☐ Folder: Extra Dry ESOTOO (Liquid sulphur dioxide)

Name
St. & No.
City..... State.....

It is also said that our National Secretary's most efficient secretary, Miss Edna Christensen, is planning an extensive tour of the West, including California, etc., etc. Well, well, well, we hope you have a wonderful trip, Miss Christensen, but be sure to be back in time for the convention, and don't fall for any dude cowboys!

Did you know that dry cleaning establishments use electric refrigeration? They cool the vats which hold the carbon tetrachloride to prevent it from evaporating as rapidly as it would under room temperatures.

REMEMBER: *The fellow who is always afraid somebody will find out what he knows often does not know anything worth finding out!*

Winners of Membership Contest:

1st Prize—\$25.00—Chicago Chapter, Paul Jacobsen, president.

2nd Prize—\$15.00—Memphis Chapter, G. L. Uetz, president.

3rd Prize—\$10.00—Kansas City Chapter, R. F. Cox, president.

Our congratulations to these chapters, and we hope all the other chapters will win next time.

MANUFACTURER'S NEWS

(Continued from page 39)

dium steel, ignition and electrical wrenches, "TuType" wrenches—a wrench that has a box end and an open end—right-angle wrenches, water pump wrenches, angle head service wrenches, construction and structural wrenches, "S" wrenches, set screw wrenches, miscellaneous special wrenches, brake wrenches, special wrenches for automotive use, refrigeration wrenches and tools, screw drivers, punches, chisels, Stillson wrenches, hammers and pliers—as well as miscellaneous tools including holding tools, tweezers and a handy shop knife.

NEW BRANCHES FOR FEDDERS

TO further serve the refrigeration and automotive radiator trade with factory representation and warehouse stocks for prompt delivery, a new Fedders Branch has

opened at 2100 Arch Street, Philadelphia, phone Rittenhouse 0662.

Herbert C. Hoover has been transferred to Philadelphia from the New York Branch. Mr. Hoover is thoroughly experienced with the policies and requirements of the trade, and looks forward to extending full co-operation based on good service and good products.

Warehouse stocks of Fedders refrigeration products and automotive radiator replacement cores are carried for quick service to the distributing trade.

Another Fedders Factory Branch has just been opened in Boston, Massachusetts, at 712 Beacon Street, under the management of Norman C. Honecker, Factory Engineer. Warehouse stocks of refrigeration equipment and automotive radiator cores are carried for immediate delivery.

In addition, this branch places factory engineering service at the command of manufacturers and distributors for any desired assistance in solving problems of design, installation and service. Mr. Honecker is thoroughly familiar with the design and application of Fedders products, as well as marketing policies in the jobbing field.

The Boston Branch telephone is Commonwealth 4610.

DAWES WITH H. CHANNON COMPANY

B. B. DAWES, formerly connected with Borg-Warner Service Parts, is now actively covering the field for the H. Channon Company. Mr. Dawes is an experienced refrigeration man and will contact the service organizations in the field.

BULLETIN ON DEHYDRATING OVENS

DESPATCH OVEN CO., of Minneapolis, Minn., has issued a bulletin describing the Despatch C Type Oven, which is recommended to insure best repair and service results. These ovens are of capacity to accommodate the larger refrigeration parts, and give uniform dehydrating baking and drying results with a minimum operating cost. The maximum oven temperature obtained is 300° F. In addition to their use in the dehydration of refrigerating units,

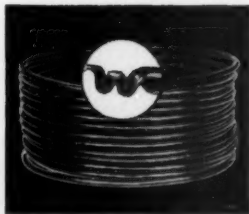
Insist On Wolverine Then You'll Know the Tubing Is Right

Tubing that is *right* is of greatest importance in refrigeration work. Such tubing assures you your work with coils, etc., will not have to be done over.

Insist on Wolverine Copper Refrigeration Tubing—and you will know the tubing is the best obtainable.

Made by the extrusion process, it is homogenous, uniform and dense. The special bright annealing process makes it evenly soft and easy to handle. It may be bent, cut, flared or threaded through walls or rafters with the "greatest of ease." It is "whistle" clean, and of mirror-like inside finish. Dehydration is complete and protected by the "W" crimp at the ends.

Look for "Wolverine" stamped on every foot—insist on obtaining it.



WOLVERINE TUBE CO.

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THE ANSUL TWIN

AT THE TOP



ANSUL
CHEMICAL COMPANY
MARINETTE WISCONSIN

they find a practical application for baking and drying of finishes, baking coils and armatures, and other processes.

These bulletins with complete description of construction details and capacities may be secured by writing the company direct at 622 Ninth St., S. E., Minneapolis.

§ § §

PENN EXPORT OFFICE IN NEW LOCATION

THE PENN ELECTRIC SWITCH CO.

Export office was moved on July 15 from 15 Laight Street, New York City, into larger quarters at 100 Varick Street. The change was necessary because of increased activity in the export market, according to A. R. Rocke, export manager.

§ § §

HARRY ALTER REFRIGERATION PARTS CATALOG OFF THE PRESS

DEALERS throughout the country are being supplied with the new issue of a 96 page catalog listing refrigeration parts, air conditioning equipment, tools and supplies, by The Harry Alter Company, 1728 South Michigan Avenue, Chicago, Illinois, with branch stores located in New York, Cleveland and St. Louis.

This greatly enlarged catalog, comprising 96 pages, shows a complete listing of the Mills Compressors and High Sides which are being offered to the trade for the first time at particularly attractive prices.

Other important additions to the Harry Alter catalog are a complete listing of air conditioning equipment by Detroit, a revised listing of refrigeration replacement gaskets, making it easy to order these particular parts. Many new tools and a great variety of equipment has been added to the pages of this catalog.

Amongst the important items listed are Imperial Fittings, Rotary Seals, Perfection Parts, Penn and Detroit thermostatic controls and Fedders equipment. A complete new page has been devoted to thermometers, and many other items necessary for the service men have been included in this new issue.

The Harry Alter Company is committed to a 100% wholesale policy and will mail this catalog only on request by accredited dealers or service men on their letterhead.

DU PONT

Artic

REG. U. S. PAT. OFF.
(DU PONT METHYL CHLORIDE)

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LOW ACIDITY . . . LOW MOISTURE

Produced under strict chemical control and PRE-TESTED before shipping. Low moisture and acidity, high purity are guaranteed.

Authorized ARTIC distributors at strategic points carry adequate stocks of ARTIC in standard containers.

Send for *ARTIC Service News*—contains current information about refrigeration, lists authorized distribution points. Copies free on request.

E. I. DU PONT DE NEMOURS & COMPANY, INC.

The R. & H. Chemicals Department

Wilmington, Delaware

The

Weatherhead
TESTING VALVE



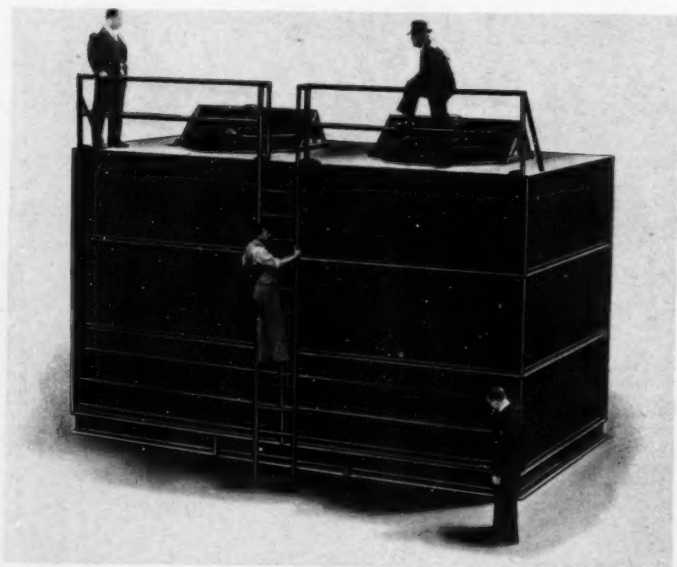
• A necessity for charging gas or oil in low and high sides—testing for leaks—purging gas from high side or gauge line—setting valves and controls. The Weatherhead Testing Valve makes all of these operations simple and accurate.

• Write for our new catalog which contains our complete listing of refrigeration valves and fittings with their modern features.

THE WEATHERHEAD CO., 632-714 Frankfort Avenue, Cleveland, Ohio

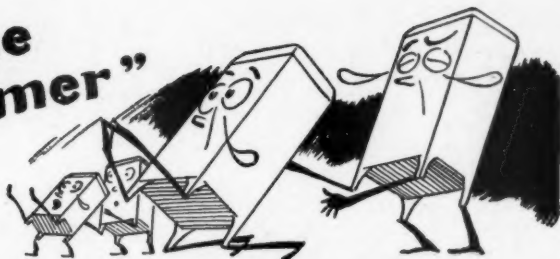


GROUP IN ATTENDANCE AT INDIANAPOLIS CHAPTER CHARTER NIGHT



BINKS COOL-
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USED FOR
COOLING
CONDENSER
WATER FOR
AIR CONDI-
TIONING AT
TEXAS CEN-
TENNIAL
EXPOSITION

**"Gimme
Gilmer"**



GILMER ELECTRIC REFRIGERATOR BELTS



MAKERS OF THE
WORLD'S BEST-KNOWN
V-BELTS

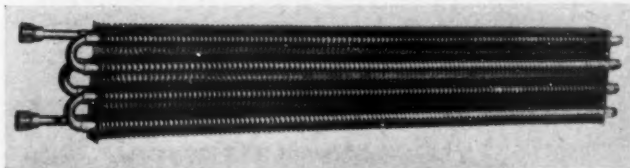
FROM the smallest of refrigerators to the largest, we've a Gilmer Electric Refrigerator Belt for each and every one . . . neat, sturdy fellows that live long, run quietly and fit like a glove! Each Gilmer Electric Refrigerator Belt is sleeved and marked for quick, easy identification. Write **NOW** for catalog containing complete details, including belts for all makes and models.

L. H. GILMER COMPANY, Tacony, Phila., Pa.

Branch Offices & Warehouses
NEW YORK CHICAGO DALLAS SAN FRANCISCO SEATTLE
Specialists in quality belts since 1903

ROME *Announces*

**A new bulletin 110 covering
ROME FROST FREE EVAPORATORS**



These compact Rome Coils can be used in many places where ordinary coils will not fit. **SEND FOR YOUR COPY.**

ROME WATER COOLED CONDENSERS of "tube within a tube" type are making money for service men who have opportunity of changing over inefficient air cooled installations.

ROME-TURNEY RADIATOR CO.

300 South James St.

ROME, N. Y.

Makers of air heating and air cooling equipment. New air cooling bulletin now ready.

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NEW BINKS COOLING TOWER FOR TEXAS CENTENNIAL EXPOSITION

THE illustration on page 60 shows one of several of the new Binks Type "K" Induced Draft Cooling Towers recently installed at the Texas Centennial Exposition for the cooling of condenser water as used in connection with air conditioning equipment. Life size figures show relative size of tower and fans.

This Binks Type K-400 tower, capacity 400 gallons per minute, is of galvanized steel construction throughout and fitted with two (2) 60" diameter fans driven by individual 3 H.P. motors at a speed of approximately 550 revolutions with a displacement of 48,000 C.F.M. The fans, located in the uppermost portion of the tower, draw the incoming air through open louvre sections at the cooling tower base.

Directly underneath the fan assembly, spray eliminators are installed to effectively minimize all drift losses.

The tower illustrated is equipped with approximately 400 clogproof Rotojet Nozzles of Binks' design which are normally operated at a water pressure of 7 pounds.

Complete information on Binks products can be obtained by writing the Binks Manufacturing Company, Chicago, Illinois.

\$\$\$

Chas. Major, Colorado

Due to a change in my occupation, I am letting my subscription to THE REFRIGERATION SERVICE ENGINEER lapse. The magazine is to my idea indispensable to anyone interested in refrigeration. As soon as conditions permit, I intend to resubscribe. It is printed in such a clear manner, with everything clearly illustrated.

REFRIGERATION - AIR CONDITIONING

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133 N. WACKER DRIVE
H. CHANNON CO. CHICAGO

NEW CATALOG ISSUED BY IMPERIAL BRASS MFG. CO.

THE 1936 catalog (No. 77-E) of the Imperial Brass Mfg. Company, of Chicago, is now off the press. It contains 64 pages, illustrated in two colors, and shows a large number of new designs in valves, fittings, service tools and other appliances. Included is a full line of oil-burner parts and equipment.

The valves listed are all brass forgings, non-porous and uniformly strong. Among the fittings, the nuts, tees, elbows and crosses, are also brass forgings, and the connectors and unions are of heavy extruded bronze rod, not subject to season cracking. Full provision is therefore made against leaking and seepage. Aluminum fittings are also listed for ammonia service.


The tools include many new designs for quicker and more effective installation and maintenance work. This is especially true of the tube cutters, which range in dimension from pocket-size to the large types for heaviest service.



Send a Picture and Win a Prize

THE editors are looking for pictures for publication either on the cover or in connection with articles. Pictures of installations—a shop picture, or any other picture of unusual interest showing applications of refrigeration will be accepted.

All contestants whose pictures are accepted for publication will receive a copy of the new book just published on "Commercial Refrigeration." Send your pictures today.



BONNEY TOOLS
A Catalog
and
Handy Data Book
for Mechanics

A Book Needed by Every Refrigeration Man - The Bonney Catalog and Handy Data Book

EVERY Refrigeration Service Engineer needs this new Bonney Tool Catalog and Handy Data Book.

56 pages crammed full of the most modern hand tools ever developed—pages devoted to specially designed refrigeration service tools—and data that will daily be helpful and useful.

Don't delay. Write for your copy today. Address

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Allentown, Pa.
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COMMERCIAL REFRIGERATION

By L. K. WRIGHT

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Bakeries
Air Conditioning
Ice Cream
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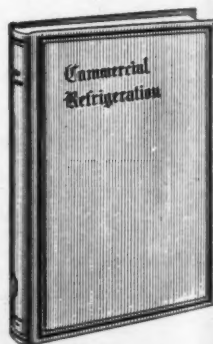
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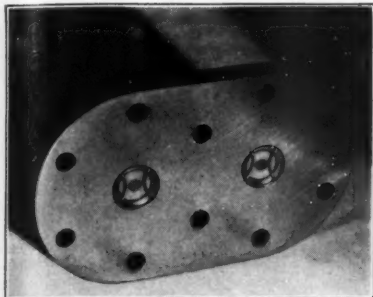
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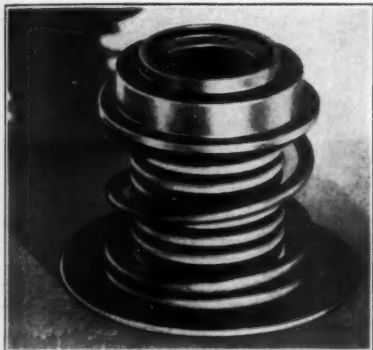


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